TWO SECTIONS—SECTION ONE

Railway Age

WITH WHICH IS INCORPORATED THE RAILWAY REVIEW

FIRST HALF OF 1927—No. 21 NEW YORK—APRIL 23, 1927—CHICAGO SEVENTY-SECOND YEAR

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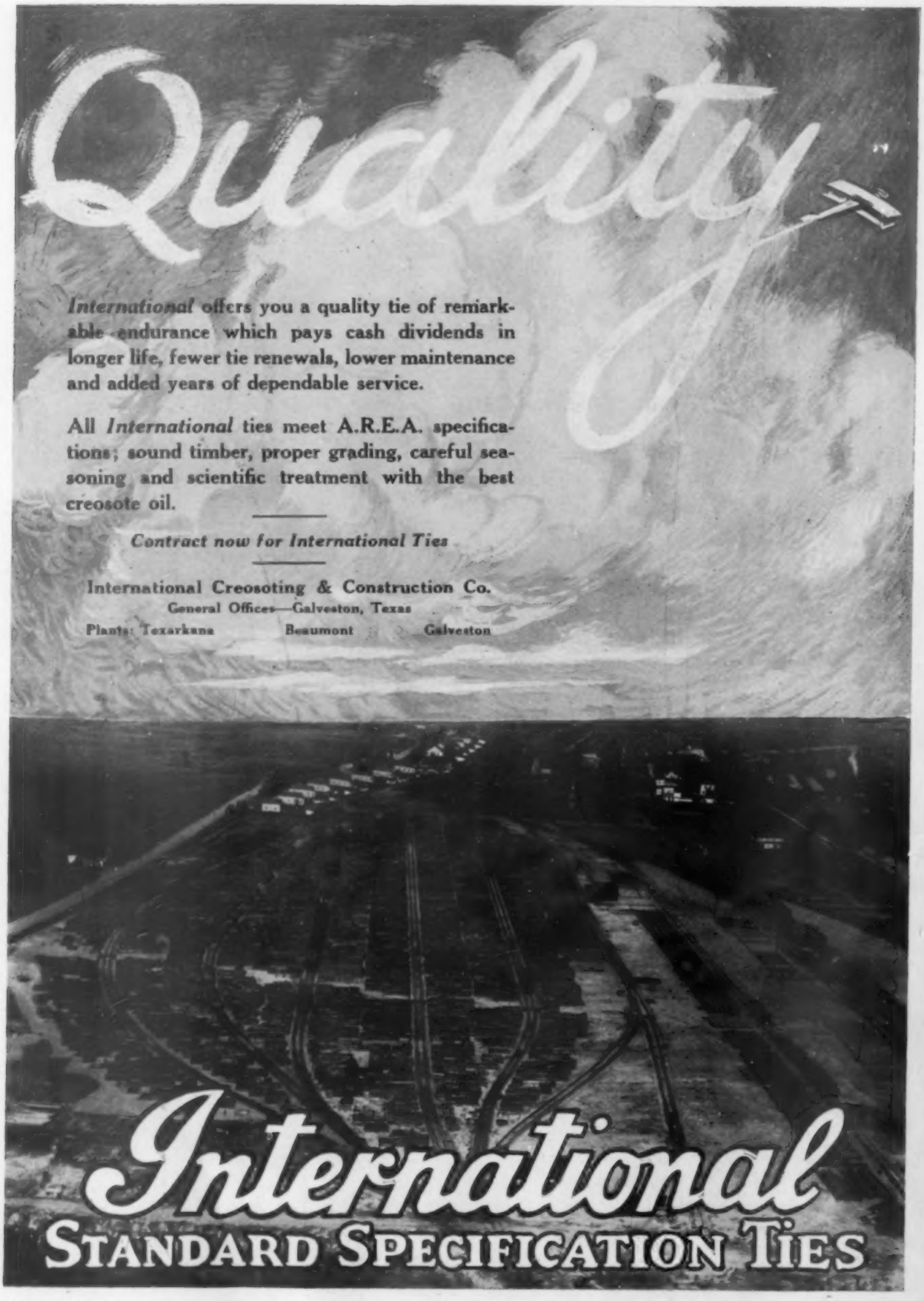
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Railway Age

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Seaboard Coast-to-Coast Limited Leaving West Palm Beach for Miami the First Time

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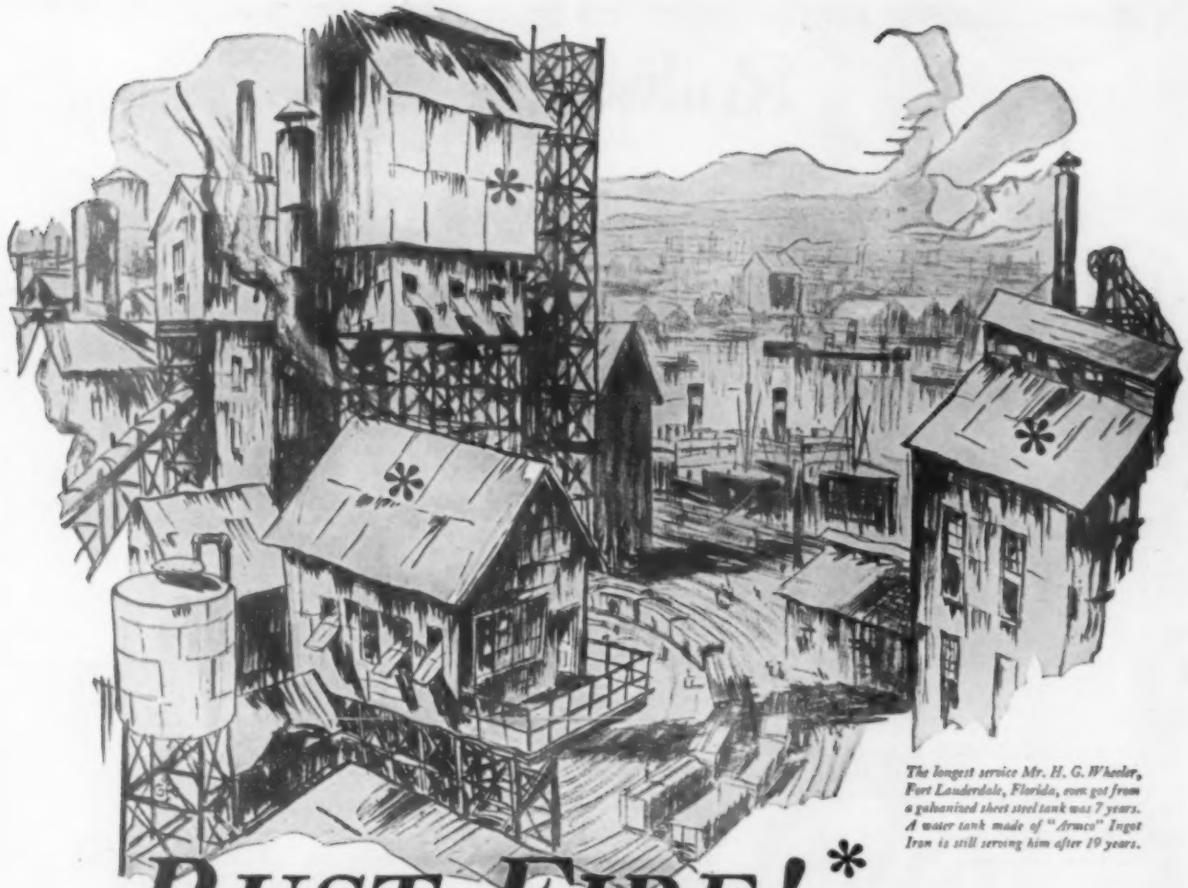

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Railway Age

Vol. 82, No. 21 *April 23, 1927*

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A Service to Shippers and the Railroads

ANOTHER service to the shipping public as well as to the railroads themselves has been inaugurated by the Transportation Division of the A. R. A., which has devised a special preparation for cleaning closed freight cars which have been contaminated with oil or grease, or cars in which offensive odors are present. The use of such an agent will not only be of service to shippers, but will reduce the number of claims filed and will also speed the return of such freight cars to serviceable condition.

Mixed Trains for Branch Lines

THE problem of making unprofitable branch lines less unprofitable is assuming more and more importance and the indications are that the railways will be called upon to face it for an indefinite period. Various solutions have been attempted, some of them with a satisfying degree of success. One of the methods that has been successful in some instances has been the consolidation of the local passenger train and the local freight train on a branch line into one mixed train. Ordinarily, branch line passenger schedules are slow and mixed trains can be run practically as fast, thereby avoiding serious deterioration in the passenger service, while local freight service is very materially improved by being scheduled. The influential citizens along branch lines are usually shippers and receivers of freight and, given an improved freight service, it has been found on some roads that little opposition develops to the slowing up of passenger train service in this way.

One-Man Operation of Rail Motor Cars

CAN the rail motor car be operated safely by one man? The answer will probably be in the negative insofar as main lines where there are many other trains is concerned. However, need it be impossible to resort to such a measure on branch lines where the protection of an absolute block can be given to obviate the necessity for flagging? Such operation has already been undertaken and, so far, we have not heard any unfavorable reports on it. The move might not prove popular with trainmen. On the other hand, there are undoubtedly situations where traffic is so light that the situation may resolve itself into a question of one-man operation or abandoning service entirely. In such a case, it would be to the advantage of employees to favor the one-man operation. If the one-man scheme can be adopted—not generally but on lines of extremely light business—it may mean the retention of service which would otherwise have to be denied the public and the dismissal of employees who could otherwise be kept at work.

The Railroads and High Water

THE widespread flood conditions now prevailing over large areas in the Mississippi valley are furnishing what may well be termed a surprise test for the maintenance of way and operating forces on the roads in those areas. Despite the possibility of high water every spring, serious floods usually come without much warning and at such infrequent intervals that the cost of the changes necessary to place the railroad facilities above the flood level are not justified economically. The increasing network of levee systems along the streams subject to overflow also introduces complications, for while they are of value when they fulfil their functions, they often cause additional damage to railroad property when they fail, owing to the sudden release of water into the low ground under considerable head. Having taken all reasonable precautions for the protection of the embankments and other facilities in advance of the coming of the water the railroads must then meet emergencies as they arise and it is to their credit that these emergencies are met and operations continued as long as humanly possible. Unremitting work under uncomfortable surroundings is the common lot of those fighting a flood and those who have gone through such experiences have no difficulty in tracing the origin of the somewhat profane but expressive phrase: "In spite of hell and high water."

Six Collisions

ANY manager who wishes further to confirm the wisdom of any expenditures that he has made for automatic train control should be interested in the record of prominent train accidents in two months—November and December—which is published on another page of this issue. In that short list there will be found half a dozen collisions in which an alert fireman could have prevented the engineman from committing the fatal error. Three or four other collisions which occurred in this same quarter-year and have been heretofore reported in the *Railway Age* could be added to the total in this class. The rule requiring enginemen and firemen to co-operate in observing signals has been printed in the pages of most train-rule books for 25 years past, and on many roads for much longer than that; but the problem of getting it uniformly obeyed is as hard as ever. The theory or belief that well-known difficulties in enforcing the fireman's monitorship could some day be overcome has been one reason for postponing the introduction of automatic train stops. These difficulties, however, grow no smaller, as time goes on. Indeed, the government inspectors seem to lay very little emphasis on the point,

often completing a report on a collision without expressing any formal censure of conduct by the fireman which, from the record, appears to be, technically, gross negligence. Evidently nothing but an automatic warning at the place where and the time when action is required, can be depended upon to keep enginemen and firemen cooperatively alert.

Simplified Train Control Maintenance

WHEN train control installations on locomotives were being discussed by mechanical and electrical officers much was made of the fact that the additional maintenance work involved would entail an unwarranted increase in enginehouse expense and in many instances an enlarged payroll. An inspection of some of the well organized train control maintenance methods at engine terminals shows that these fears were unfounded. The railroads and manufacturers have "put their heads together" and have so simplified the routine inspection and testing operations that the technical adjustments and continuity of the electrical circuits can be tested thoroughly by the average maintenance electrician. Moreover, through the use of special electrical testing fixtures, the work has become a matter of minutes instead of hours. This labor-saving solution of what seemed to be a difficult problem when train control equipment was first installed on engines, is in the direction of greater efficiency and economy of operation by increasing the productivity of maintenance forces through educational processes and the aid of mechanical and electrical tools.

Help the Engineman

THE engineer or operator of a modern stationary power plant has at his command numberless steam gages, air gages, gas analyzers, steam-flow meters, instantaneous and recording voltmeters, ammeters, wattmeters, etc., the sole purpose of which is to supply a knowledge of detailed operating conditions essential to securing maximum overall plant efficiency. The cab of the modern steam locomotive also is quite well filled with gages, pipes and miscellaneous apparatus, but, until recently, almost no mechanical aid has been afforded enginemen in determining whether locomotive boilers are functioning properly and engines being worked to the best advantage. The great need for some check on the latter, besides each engineman's senses of sight and hearing, was emphasized at the last convention of the International Railway Fuel Association when it was pointed out that under certain conditions 200 lb. of steam pressure in the boiler may have decreased to 80 lb. in the cylinders, and a difference of one notch in the position of the reverse lever may account for a 20 per cent difference in fuel consumption. The superheater pyrometer, accurately maintained, affords a partial check on firing efficiency, indicating at once among other things the effect of carrying too high a water level, and should be more generally used. Extended experience on a number of roads shows that the back pressure gage tells an engineman much about how a locomotive is operating, and the combination initial and back pressure gage tells him a lot more. A number of able mechanical department officers also feel that an engineman should have the benefit of automatic cut-off control based on a predetermined constant back pressure. Whichever method is adopted, it appears to be an established fact that enginemen in general should be given more mechanical aid in determining whether they are getting the best possible results from locomotives.

A Question of Discipline

A FEW months ago a disastrous collision occurred as the result of the entire crew of a freight train having fallen asleep. The records of the men were good, but of course their carelessness in this instance was wellnigh inexcusable. After holding the men out of service a month or two the railroad restored them to their positions. It is impossible to judge accurately the wisdom of an act of discipline without an intimate acquaintance with all the facts and the individuals involved. Nevertheless thought and discussion on various disciplinary problems are profitable, even though no definite conclusions can be reached. Some might feel that the action in this case was too lenient. However, it must not be lost sight of that in a long period of time the best of men will occasionally slip. The man in train service is unfortunately situated in that when he makes a mistake the results may be fatal. Men in many other walks of life may commit errors just as inexcusable and escape with but little criticism. The man who errs once or twice in a lifetime may be a dangerous man, but humanity being what it is he is the best that can be secured. Severe punitive measures against such a man can have no healthy moral effect and punitive measures which do not secure such an effect are mere brutality. The railroad must guard itself against the man who errs frequently, but such a weakness ought to show itself early in his career. If an employee has many years of blameless service behind him, the fact that he makes one fatal error is no indication that he is utterly untrustworthy and likely to err again. Sleeping on duty is by no means an infrequent failing in train service, and it and other glaring infractions of the rules cannot be condoned. At the same time, can there be a more pitiful situation than that of a venerable engineman with a long and honorable record behind him facing disgrace and perhaps, as sometimes happens, even a term in jail for one fatal error? The meting out of discipline is a disheartening job. Too great leniency is a disservice to employees and the public. Unnecessary severity is quite as undesirable.

The Trend Toward Heavier Rail

CONVINCING evidence of the efforts being made by the railroads to increase the strength of their tracks to meet the growing demands of traffic is afforded by the statistics of rail production in 1926, published in the *Railway Age*, of April 16. Not only was the total tonnage greater than in any other year since 1913, but the tonnage of rails weighing 100 lb. per yd. or heavier, 1,966,440 tons, exceeded the total output of rail of all weights in 1914.

This increase in the purchases of heavier sections, which has extended over a considerable number of years, has not resulted in any marked change in the average weight of rail in all main tracks for it requires a difference of 410,000 tons between the weight of the new rails laid and that of the old rails released from use in main tracks to effect an increase of only one pound per yard in the average weight of rail in the 260,000 miles of main tracks of the Class I railroads. Consequently it is not surprising that the average weight of rail in these tracks for the entire country increased only from

82.89 lb. per yd. on December 31, 1921, to 85.99 lb. at the end of 1925. On Class I railroads in the Eastern district it increased from 91.39 lb. to 95.54 lb. and in the Western district from 78.99 lb. to 81.08 lb.

But the railroads are not concerned so much with an increase in the weight of rail on all lines as they are in having heavier rail in the tracks carrying the heavier traffic. What they have accomplished in this direction may be measured by the increased mileage of tracks having heavy rail, say sections heavier than 100 lb., as reported by the Interstate Commerce Commission. The gain in this direction is shown in the table below.

MILES OF TRACK ON CLASS I RAILROADS HAVING RAILS OF 105-LB. SECTION OR HEAVIER.

	December 31, 1921	December 31, 1925
Eastern District	8,668	15,700
Southern District	116	1,131
Western District	21	1,104
Total	8,805	17,935

It is observed that the western and southern roads have made a fair start in the use of sections in excess of 100 lb. and it is certain that the figures for 1926, which are not yet available, will show appreciably greater mileages. In the Western district this increase is explained largely by the adoption of the 110-lb. section as the standard on a number of roads, while in the Southern district the mileage of heavier rail is represented primarily by 130-lb. rail laid by the coal-carrying roads in the Pocahontas region. However, it is worthy of note that a few western roads are laying some 130-lb. rail, including one that is now undertaking a program of renewals with this section on its main lines extending north and west from Chicago. It is clear, therefore, that the railroads as a whole are committed to the policy of increasing the use of heavier sections as rapidly as funds can be made available for this purpose.

Capitalization Less than I. C. C. Valuation Basis

EVEN if the basis for valuing the railways for rate-making purposes announced by the Interstate Commerce Commission in the O'Fallon case could be sustained by the courts without any increase it is at least more than sufficient to show that the railways as a whole are under-capitalized rather than over-capitalized.

It will be recalled that one of the objects of the original undertaking of the valuation work was to settle the arguments on that question, and even the commission's basis, which is practically the minimum that could be used, except for land, which is valued on the basis of adjacent land values at the time of valuation, seems to remove any room for further dispute on that point.

Last week the commission issued a special report on the capitalization and income of Class I railways for 1926 which stated their grand total capitalization as $18,732,355,349, of which $7,717,150,501 was stock and $11,015,204,848 was long-term debt. The commission's tentative valuation figure as of 1919 was $18,900,000,000, and it says in its O'Fallon decision that since then the investment in railway property has increased by 4 billions of dollars, which would make a total of $23,900,000,000. While the tentative valuation as of 1919 is of course still subject to revision, it was based, like that in the O'Fallon case, mainly on the 1914 level of prices plus investment since. The commission would probably make some further deduction for depreciation and it is also true that the 1919 figure included the Class II and Class III railways and switching and terminal companies, but they represent comparatively little difference in the aggregate.

The total outstanding capitalization of the Class I railways at the end of 1919 was $16,247,087,753, so that it has increased by $2,485,087,000 since. The commission's latest figures covering all the railways of the United States are those for 1925, which were also issued only a few days ago. The commission's statistical reports give several different figures for total railway capitalization. The highest is $23,644,224,072 for 1925, which compares with $20,950,175,145 as of 1919. But the report says that of the total for 1925, $5,453,710,743 was held by reporting steam railways (that is, it represents duplication) "so that $18,190,513,329, or $74,460 per mile of road, is the net sum which would be necessary to purchase these railways, considered as one system, on the basis of the par value of their stocks and bonds not held under railway ownership." Including the switching and terminal companies, which are not used in the figure from which the average per mile is taken, the commission's report says, makes the "total net figure for railway capital $18,709,375,780."

What We May Expect in Tie Conservation

STUDIES of measures adopted in Europe for the conservation of railway ties have demonstrated that greater refinement in the protection of ties from decay and mechanical destruction has been fruitful of appreciably longer average life than is obtained on American railways. However, such estimates of life—based on records of certain lots of ties—like the service records of ties in test tracks on American railways, leave much to be desired since they cannot be translated directly into terms of average renewals per mile of track.

A more specific comparison with our own tie renewal records is afforded by figures for the "sleeper" renewals made by the four group railway companies of Great Britain in 1925 and 1926, as recorded in an abstract of the annual reports of these properties appearing in the Railway Gazette (London). Expressed on the basis of tie renewals per mile of track, they are as folows:

	1926	1925
London, Midland & Scottish	68	67
London & Northeastern	54	78
Great Western	72	98
Southern	97	130

American railway officers may derive some comfort from the fact that these records show much the same lack of uniformity in tie life as is to be found in comparisons of the renewal records of one American railroad with those of another or of one year with another. Apparently variations in standards of tie condition, in refinements of conservation practices and in appropriations for tie renewals from year to year, effect the net result in Great Britain much as they do here. The renewal record of the Southern is so far out of line with those of the other groups as to indicate a wide disparity of conditions and must for this reason be left out of consideration. The marked reduction in renewals in 1926 as compared with 1925 on three of the British properties is obviously the result of the retrenchment forced on them by the disastrous coal strike.

Before attempting a comparison of the figures above with the corresponding records of American roads, it is necessary to take into account the smaller number

of ties used on the English railroads per unit of track length, approximately 2,000 per mile of track. In other words, they must be increased by about 50 per cent to be comparable with American tie renewals, which means that they would range from about 81 to 147 ties per mile of track (omitting the figures for the Southern).

The upper limit in this range is not far removed from a fair average of the annual tie renewals per mile of track reported by those American roads which have followed the most consistent policy in the protection of their ties from decay and mechanical deterioration. On the other hand, the lower limit in the British figures given above is far below any American record, other than such as have resulted from the most severe postponement of renewals. Surely this comparison shows that the full economies to accrue from proper protection of tie timber have not yet been realized on this side of the Atlantic.

Where New Capital Comes From

THE statement was made in these columns recently that the dividends paid by the railroads had in 1926 exceeded the taxes paid by them for the first time in the past five years and the second time in the past seven years. It was, on the other hand, shown that the excess of dividends over taxes was a mere one per cent and it was stated that "surely no other than the repressively regulated railroad industry could expect to call itself prosperous if it continued indefinitely to give the tax-gatherers as great a return as it yielded to the partners in the enterprise."

Where the Dividends Go

While all the taxes are paid to tax-gatherers—in other words to governmental authorities of one kind or another outside the railroad industry—quite a different situation rules with respect to the dividends. The record shows that the taxes paid in 1926 total $388,682,377 and the dividends totaled $392,791,959. It would be interesting to ascertain how large was the proportion of these dividends paid by subsidiary companies to parent companies exercising control by stock ownership. Thus the 392 million of dividends included the 6½ million of dividends paid in 1926 by the Michigan Central and the 3½ million paid by the Big Four, nearly all of which accrued to the New York Central and the 7 million paid by the Pittsburgh & Lake Erie over one-half of which accrued to the New York Central. They also included the 3 million Central of New Jersey dividends which accrued in part to the Reading, as well as the latter's 9 million that accrued in part to the Baltimore & Ohio and New York Central. There was also the Norfolk & Western's 14 million paid in part to the Pennsylvania, the Louisville & Nashville's 7½ million paid in part to the Atlantic Coast Line, and so on through an extended list. While it may be true that the railroad dividends exceed the taxes by the slightest margin, the amount of taxes paid to federal, state and local governments exceeds by a margin by no means slight the amount of dividends actually paid to that part of the public which is represented by the stockholder.

It may be suggested, on the other hand, that the total of dividends paid will not include the guaranteed dividends paid by non-operating roads that have been leased. These appear in the income accounts of the Class I railroads as part of the "Rent for leased roads." They are a fixed charge and are in many respects similar to bond interest. The amount paid by the Class I roads in the form of rent for leased roads in 1926 totaled $161,797,211 and the interest payments on funded debt were $494,557,655. These two figures do not need particular elucidation because much has already been said here and elsewhere regarding the undue proportion that railway funded debt bears to total capitalization and the unduly large share of the earnings that have to be appropriated for interest and other fixed charges.

Keeping Down Fixed Charges

It is rather surprising, however, that there has been so little comment regarding the principal method that the railways have adopted to keep down their fixed charges. This is shown by reference again to the 1926 dividend payments, which totaled $392,791,959. The net income after fixed charges, however, which would fairly closely approximate the funds made available for dividends totaled $804,813,600. It used to be considered extremely conservative financial policy for the railroads to invest in their properties one dollar for each dollar paid in dividends. This is very nearly what the railroads did in 1926.

In 1926, capital expenditures totaled 875 million and in the past four years such expenditures have averaged about 900 million annually. However, the total of railway bonds, notes and stock sold in 1926 was 446 million. The 875 million spent for capital improvement is a gross and not a net charge, in other words does not consider retirements. This is also true of the 446 million of securities issued because a large proportion of this total included refunding issues to meet maturities of previously issued securities. It is of interest also that railway financing in 1926 was only 7.5 per cent of all financing, whereas in 1916 railroad financing was 20 per cent of all financing and for 1920 to 1924 ranged between 16 and 24 per cent.

Capital Expenditures from Earnings

If these figures mean anything, they mean that the railroad stockholder is supplying a surprisingly large proportion of the railroads' new capital in the form of deprivation of dividends, or, as it is said, he is an involuntary investor. The fact that so much of the money otherwise available for railroad dividends is being put back into the properties explains why such a property as the Pennsylvania can earn only 4.8 per cent on its book value and yet yield a return after fixed charges equivalent to 13.53 per cent on the stock, or why the Southern Pacific can earn 3.98 per cent on its book value and have available $11.29 per share on the stock. Of course, it also follows that if the railways were to devote a larger portion of their net income to dividends they might make their stock more attractive and find themselves able to finance improvements with stock instead of interest bearing indebtedness which they have been endeavoring, insofar as possible, to keep at a minimum.

The carriers are criticized for being too conservative with respect to the points here discussed. However, they probably have in mind that in 1926, the busiest year in their history, they earned only 5.13 per cent on their book value. The more prosperous roads are no doubt somewhat uncertain regarding the possibilities of recapture. Under such conditions it would seem the wise thing to be conservative. Meanwhile the Interstate Commerce Commission continues to refuse to permit the carriers to earn the 5¾ per cent return to which they are entitled under the terms of the Transportation Act. While there is good reason for the complaint that the railroads pay out so large a proportion of their earnings in taxes, there is also good reason for the complaint that the railroad earnings themselves are by no means large enough.

The Northern Pacific 4-8-4 Type Locomotives

Used in passenger service over mountain divisions—
Tractive force, with booster, 68,900 lb.

ATTENTION was called in the January 1, 1927, issue of the *Railway Age* to the twelve 4-8-4 type locomotives ordered by the Northern Pacific, the first of which was delivered late in December, 1926. These locomotives were placed in passenger service between Jamestown, N. D., and Glendive, Mont., and between Livingston, Mo., and Missoula. The last named division runs through mountainous territory and has grades as high as 2.2 per cent.

These locomotives develop a tractive force of 57,500 lb. without the booster, which provides an additional starting tractive force of 11,400 lb. The boiler carries a pressure of 210 lb. per sq. in. and the diameter and stroke of the cylinders is 28 in. by 30 in. The diameter of the driving wheels is 73 in. Trial runs made with these locomotives have shown that they are capable of hauling nine steel passenger cars up a 2.2 per cent grade without a helper and also of hauling unassisted 11 steel passenger cars over Bozeman Mountain on the Livingston - Missoula division, which has a grade of 1.8 per cent, at sufficient speed to maintain the schedule.

Front End of the "Northern Pacific" Type Locomotive

Conditions Affecting the Design

The design of the 4-8-4 type locomotive was the result of study on the part of the railroad company in co - operation with the builders to produce a locomotive of the best design and proportions to meet the operating conditions just described. The 2.2 per cent grade over which these locomotives operate was a factor in determining the tractive force of 57,500 lb., which with the addition of the trailer booster, is increased to 68,900 lb., which is a great advantage for starting or operation at slow speed over the maximum mountain grade. The weight carried on the drivers is 260,000 lb. which gives a factor of adhesion of 4.52. Although the pressure carried at the present time is 210 lb., the boilers and machinery are designed to carry a working pressure of 225 lb., so that if it is later desired to go to 225 lb. boiler pressure, in certain territory, the locomotive will develop a tractive force of 61,600 lb. exclusive of the booster, and a total tractive force of 73,975 lb. with the booster in operation.

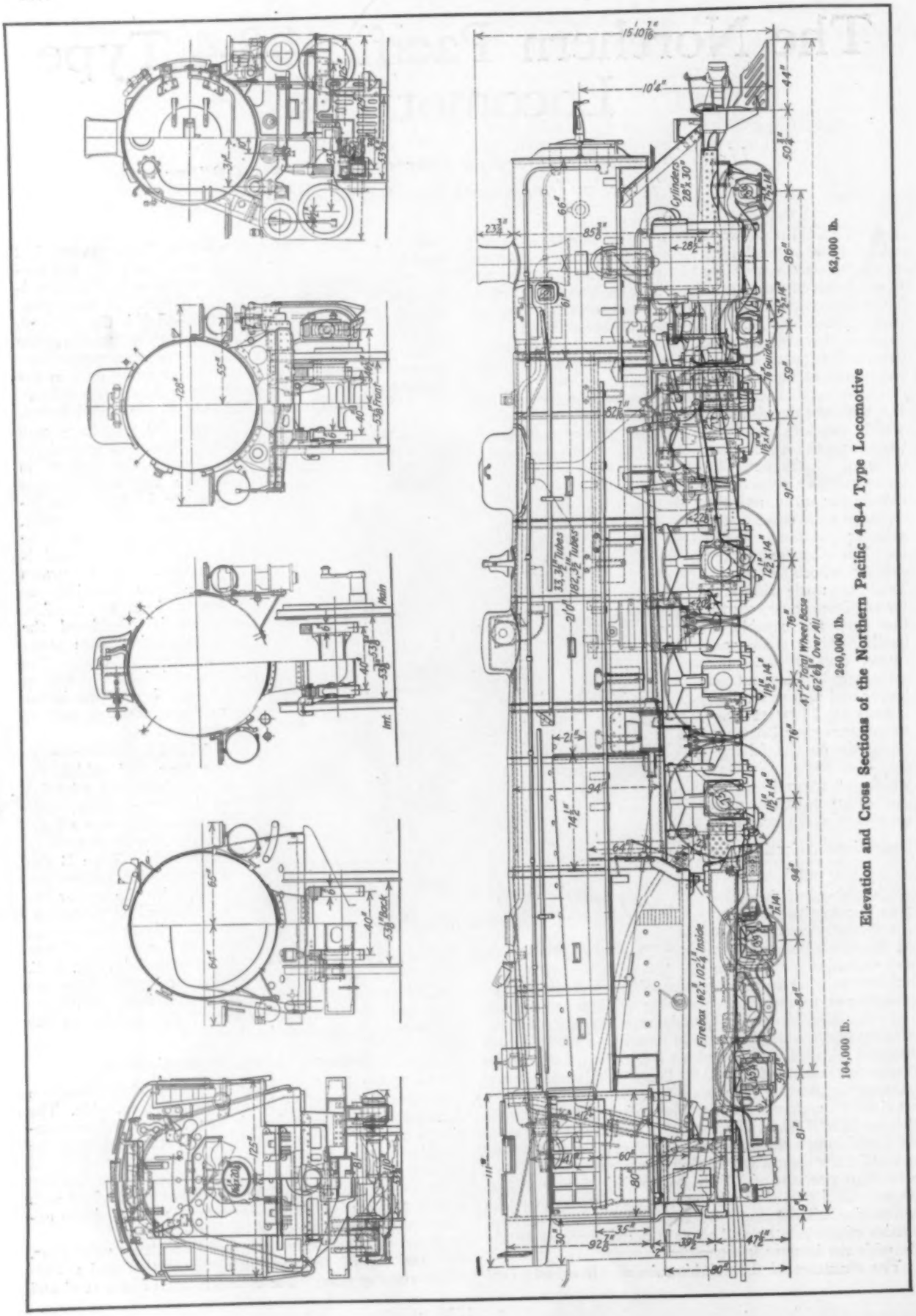
The character of the sub-bituminous (Rosebud) coal used, which is of comparatively low B.t.u. content, had considerable influence in the design of the boiler and firebox. An exceptionally large grate area and firebox is required to satisfactorily burn this fuel. A total grate surface of 115 sq. ft. is provided, but it is the intention when burning a better grade of coal to reduce the grate area to about 95 sq. ft. To reduce the grate area, a temporary brick wall is installed on the grate bars in the front end of the firebox as shown in the elevation drawing. A steel plate cover is bolted to the grates underneath the temporary wall and is secured around the sides of the firebox in such a way as to prevent leakage of air. The installation is such, however, that the grates may be rocked when the wall is removed. The grates have been installed as nearly level as possible, which is considered the best practice when burning Rosebud coal. The firebox is built with a drop of only four inches in the mud ring from the back to the front end.

The long overhang at the rear end which resulted from the adoption of this large firebox, made it necessary to use a four-wheel trailer truck to carry the weight. Type B du-Pont-Simplex stokers are used, with the stoker engine located on the tender, which relieves the rear end of the locomotive of that item of weight. Q. & C. cast steel grate bars are applied instead of the customary cast iron. With the most careful designing, however, the weight on the trailer truck is 104,000 lb.

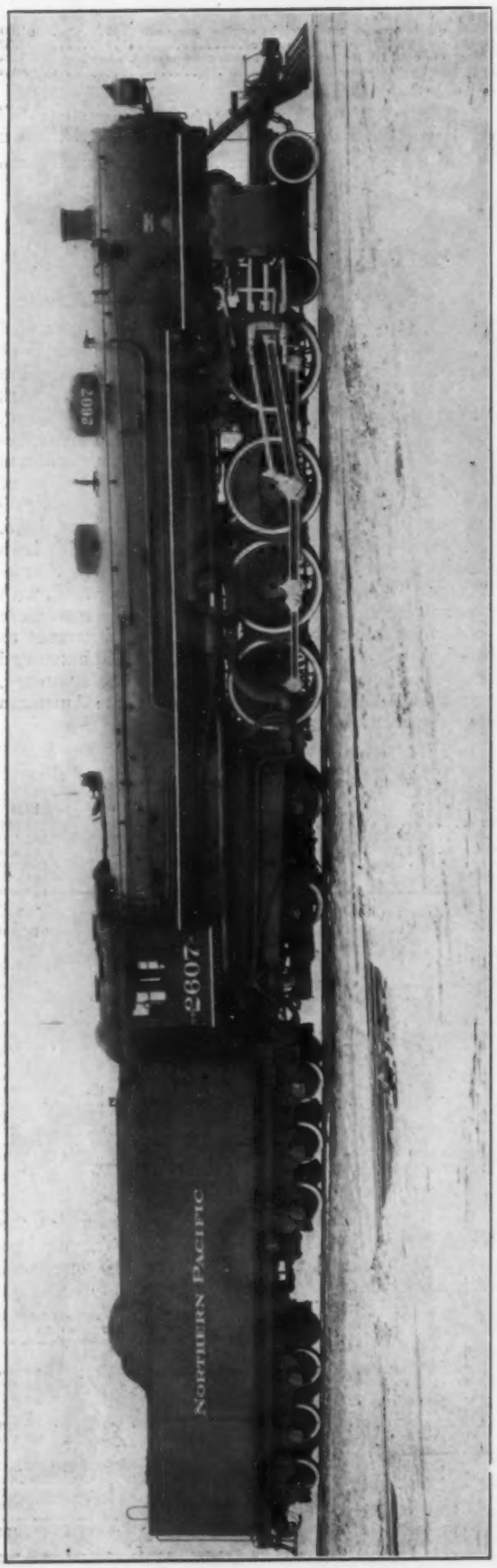
Boiler of Large Proportions

The boiler is of the wide firebox, conical-connection type, with a firebox 162 in. long by 102¼ in. wide. The combustion chamber is 74½ in. long. The total evaporative surface of the boiler is 4,600 sq. ft., which with the addition of the Type E superheater surface of 1,992 sq. ft., gives a combined evaporative and superheating surface of 6,592 sq. ft. The smoke box is provided with a Mudge Security Unit spark arrestor and a single exhaust pipe with a nozzle 7 in. in diameter.

Steam distribution is controlled by a Baker valve gear, designed for 87 per cent maximum cut-off and a Precision reverse gear. The cylinders are of cast steel and



Elevation and Cross Sections of the Northern Pacific 4-8-4 Type Locomotive



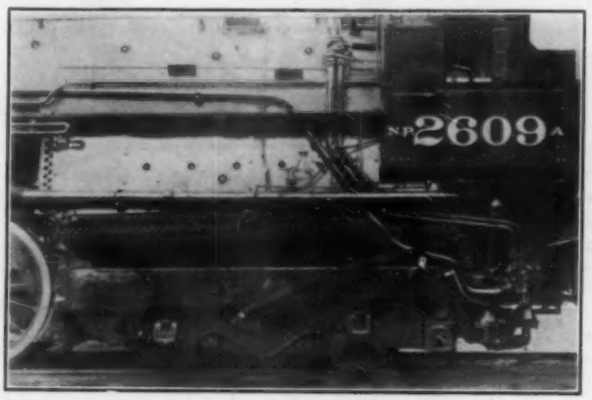
The Northern Pacific 4-8-4 Type Locomotive Built by the American Locomotive Company

all steam cavities are designed to be self-draining. The stoker engine, dynamo, booster, blower and air compressor are operated with superheated steam.

The Running Gear

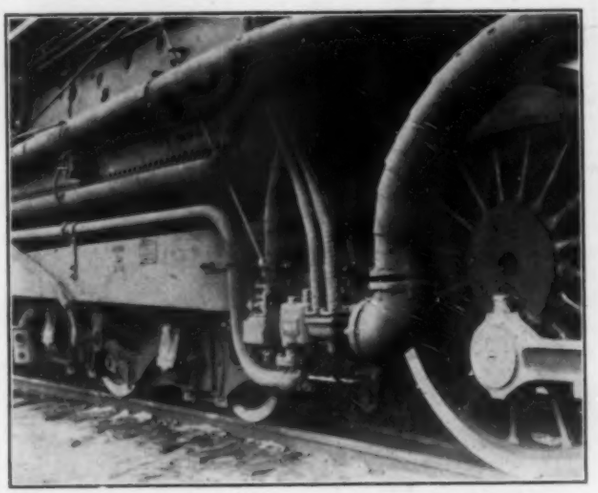
The total weight of the engine is 426,000 lb. of which 260,000 lb. is carried on the drivers; 62,000 lb. on the front truck and 104,000 lb. on the trailing truck. The total driving wheel base is 20 ft. 3 in. and the total wheel base of the engine is 47 ft. 2 in.

The engine truck is the constant resistance type having a Commonwealth cast steel frame cast in one piece. It has 36-in. diameter wheels with 7½-in. by 14-in. journals, provided with removable hub-liners.



The Trailer Truck and Firebox

All of these locomotives are equipped with Hubbard manganese steel crossheads. The frames are of high test vanadium cast steel. The front drivers are equipped with the Alco lateral motion device. The main driving boxes are fitted with supplemental bearings which extend below the horizontal center line of the journal to oppose the rapid wear below that line caused by the reciprocating piston thrusts. All of the driving wheel hubs, as well as the trailing truck hubs, are equipped with Smith adjustable hub liners made of Hunt-Spiller gun iron. The back end of main rods are equipped with floating bushings which work in Hunt-Spiller gun iron bushings pressed into the rod. All the crank pins, including the main, are hollow bored.



The Cradle Casting Is Outside the Trailer Frame—The Exhaust Steam Injector Is in the Foreground

The four-wheel trailer truck is the Commonwealth Delta type having 36-in. wheels at the front and 45¾-in. wheels at the rear. The front axle is arranged to float laterally in the journal boxes as they do not assist in guiding the locomotive around curves. A Franklin booster, the exhaust of which is carried forward to the cylinder saddle, drives on the rear axle. A special design of the Commonwealth frame cradle was required in order to obtain the best possible ash pan capacity to meet the conditions imposed by the practically level mud ring of the firebox and by the four-wheel trailer truck. The rails of the cradle are located outside the wheels which gives it an overall width about equal to the outside width of the firebox.

Special Equipment

Each locomotive is equipped with an Elesco exhaust steam injector; American type multiple disc throttle valves built into the superheater header castings; Ashcroft cut-off control gages; Weston speed indicator and Hoofer ratchet type flange oilers. Six of the locomotives are finished with Duco lacquer.

The Tender

The tender, which has a capacity of 15,000 gal. of water and 24 tons of coal, is carried on two Commonwealth six-wheel trucks. The wheels are 37-in. in diameter and have 6½-in. by 12-in. journals. The tender frame is also of a commonwealth steel casting.

Table of Dimensions, Weights and Proportions of the "Northern Pacific" (4-8-4) Type Locomotive

Railroad	Northern Pacific
Builder	American Locomotive Co.
Type of locomotive	4-8-4
Service	Passenger
Cylinders, diameter and stroke	28 in. by 30 in.
Valve gear, type	Baker
Valve, piston type, size	14 in.
Maximum travel	9 in.
Outside lap	1⅞ in.
Exhaust clearance	⅛ in.
Lead in full gear	7/32 in.
Cut-off in full gear, per cent	88.88
Weights in working order:	
On drivers	260,000 lb.
On front truck	62,000 lb.
On trailing truck	104,000 lb.
Total engine	426,000 lb.
Tender	313,900 lb.
Wheel bases:	
Driving	20 ft. 3 in.
Total engine	47 ft. 2 in.
Total engine and tender	90 ft. 0 in.
Wheels, diameter outside tires:	
Driving	73 in.
Front truck	36 in.
Trailing truck, front	36 in.
Trailing truck, rear	45¾ in.
Journals, diameter and length:	
Driving, main	12½ in. by 14 in.
Driving, others	11½ in. by 14 in.
Front truck	7½ in. by 14 in.
Trailing truck, front	7 in. by 14 in.
Trailing truck, rear	9 in. by 14 in.
Boiler:	
Type	Conical
Steam pressure	210 lb.
Fuel, kind	Sub-bituminous
Diameter, first ring, inside	82 7/16 in.
Firebox, length and width	162 in. by 102¼ in.
Combustion chamber, length	74½ in.
Tubes, number and diameter	33-3½ in.
Flues, number and diameter	182-3½ in.
Length over tube sheets	21 ft.
Grate area	115 sq. ft.
Heating surfaces:	
Firebox and comb. chamber	430 sq. ft.
Arch tubes	55 sq. ft.
Tubes and flues	4,115 sq. ft.
Total evaporative	4,600 sq. ft.
Superheating	1,992 sq. ft.
Comb. evaporative and superheating	6,592 sq. ft.
Tender:	
Water capacity	15,000 gal.
Fuel capacity	24 ton
General data estimated:	
Rated tractive force, 85 per cent	57,500 lb.
Rated tractive force of booster	11,400 lb.
Rated tractive force, with booster	68,900 lb.
Weight proportions:	
Weight on drivers ÷ total weight engine, per cent	61.00
Weight on drivers ÷ tractive force	4.52
Weight on rear trailer wheels ÷ tractive force of booster	5.26
Total weight engine ÷ comb. heat. surface	64.6
Boiler proportions:	
Tractive force ÷ comb. heat. surface	8.72
Tractive force x diam. drivers ÷ comb. heat. surface	637
Heat. surface, firebox and arch tubes ÷ grate area	4.22
Heat. surface, firebox and arch tubes, per cent of evap. heat. surface	7.36

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended April 9 amounted to 959,474 cars, an increase of 30,131 cars as compared with the corresponding week of last year and of 41,074 cars as compared with 1925, in spite of a decrease of 11,516 cars in coal loading. Coal loading for the week amounted to 152,876 cars, reflecting the effect of the strike in the bituminous coal mines. Before the strike loading had been in excess of 200,000 cars. However, there was an increase of 13,869 cars as compared with the corresponding week of 1925.

All districts showed increases as compared with both 1925 and 1926 except the Northwestern and the Southwestern which showed a decrease as compared with 1925, but livestock, merchandise and miscellaneous were the only commodity classifications to show increases as compared with last year. Miscellaneous freight amounted to 380,740 cars, an increase of 40,462. The summary, as compiled by the Car Service Division of the American Railway Association follows:

Revenue Freight Car Loading

WEEK ENDED SATURDAY, APRIL 9, 1927.

Districts	1927	1926	1925
Eastern	228,060	227,080	220,211
Allegheny	201,331	191,895	191,159
Pocahontas	57,195	47,550	44,924
Southern	161,906	155,069	154,094
Northwestern	113,985	113,442	114,054
Central Western	126,504	124,347	121,969
Southwestern	70,493	69,960	71,989
Total Western Districts	310,982	307,749	308,012
Total all roads	959,474	929,343	918,400
Commodities			
Grain and grain products	35,766	35,871	31,165
Live stock	26,434	24,397	25,516
Coal	152,876	164,392	139,007
Coke	11,898	12,674	11,296
Forest products	69,065	74,104	78,549
Ore	11,283	13,251	14,602
Mdse. l. c. l.	271,412	264,376	261,151
Miscellaneous	380,740	340,278	357,114
April 9	959,474	929,343	918,400
April 2	992,745	928,303	923,400
March 26	1,008,888	967,945	932,769
March 19	1,006,861	977,018	911,481
March 12	1,005,715	967,425	926,119
Cumulative total, 5 weeks	14,317,294	13,840,631	13,624,209

Car Loading in Canada

Revenue car loading at stations in Canada for the week ended April 9 showed a decrease from the previous week of 2,280 cars and an increase over the same week last year of 6,237.

	Total for Canada			Cumulative totals to date	
Commodities	Apr. 9, 1927	Apr. 2, 1927	Apr. 10, 1926	1927	1926
Grain and grain products	6,863	7,160	4,696	114,192	94,094
Live stock	2,318	2,273	2,062	29,413	28,891
Coal	5,664	5,893	3,748	90,327	63,607
Coke	272	316	431	5,116	6,718
Lumber	3,730	3,656	3,690	44,274	45,820
Pulpwood	3,113	4,618	2,978	76,198	53,409
Pulp and paper	2,191	2,183	2,503	31,083	36,926
Other forest products	2,937	3,366	3,344	47,704	50,252
Ore	1,328	1,490	1,362	19,512	19,932
Merchandise, l. c. l.	17,650	17,984	16,568	228,170	209,787
Miscellaneous	13,944	13,351	12,191	164,897	156,975
Total cars loaded	60,010	62,290	53,773	850,886	766,411
Total cars received from connections	39,692	41,561	38,020	547,191	520,753

Mechanical Cinder Plant Serves Several Tracks

Cinders May Be Dumped into Both Hoppers at Once, Independently of the Operation of the Bucket

MODERATE first cost and economy in the use of track space are two of the primary advantages claimed for a new type of cinder-handling plant recently installed on a number of roads. To these advantages must be added that of particular adaptability to enlargement at a minimum added expense whenever increased capacity is required. The characteristics of this plant may best be brought out by describing an installation of this kind recently placed in service at an engine terminal of the St. Louis-San Francisco at Kansas City, Mo., which is illustrated herewith.

The Levers for the Operation of the Hopper Gates Lie in Slots in the Concrete Platform When Not in Use

It consists of a concrete tunnel extending transversely under the locomotive tracks, this tunnel serving as the runway for an ash bucket which receives the cinders dumped into cinder pits serving the locomotive tracks. At one end of this tunnel the bucket is hoisted up a structural steel tower and its contents dumped into an elevated hopper which in turn discharges into a pivoted spout for the delivery of the ashes to a gondola car on an adjoining service track. Steel angles attached to the side walls of the tunnel serve as rails on which the ash car is moved along the length of the tunnel, these angles being continuous with guides that extend up the hoist tower.

The Bucket Tunnel Showing the Duplicate Gates for Each Track Hopper

Each locomotive track is served by a cinder pit or cast

iron hopper 12 ft. in length to accommodate the largest locomotives without spotting more than once and each hopper holds 80 cu. ft. of ashes so that the entire contents of a locomotive ash pan may be discharged into the hopper with the gates closed. This protects the bucket from the warping effect of hot ashes being dropped directly into it and permits the dumping of cinders into the hoppers independent of the operation of the ash car in the tunnel below. Each hopper is divided into two halves by a transverse partition, each half being equipped with an independent set of radial under-cut gates so that the two halves of the hopper may be dumped as independent units if desired. The bucket is interlocked with the hopper gates so that the gates cannot be opened unless the ash bucket is in a position to load.

The opening and closing of the hopper gates is effected by means of hand levers which normally lie in slots flush with the concrete platform between the locomotive tracks. No effort is required to raise these levers from the slot until they have passed through an angle of 45 deg. From this position the levers are swung through a 90-deg. arc to open the gate and if it is desired to lock the gates open, they are dropped into the slot opposite to the closed position.

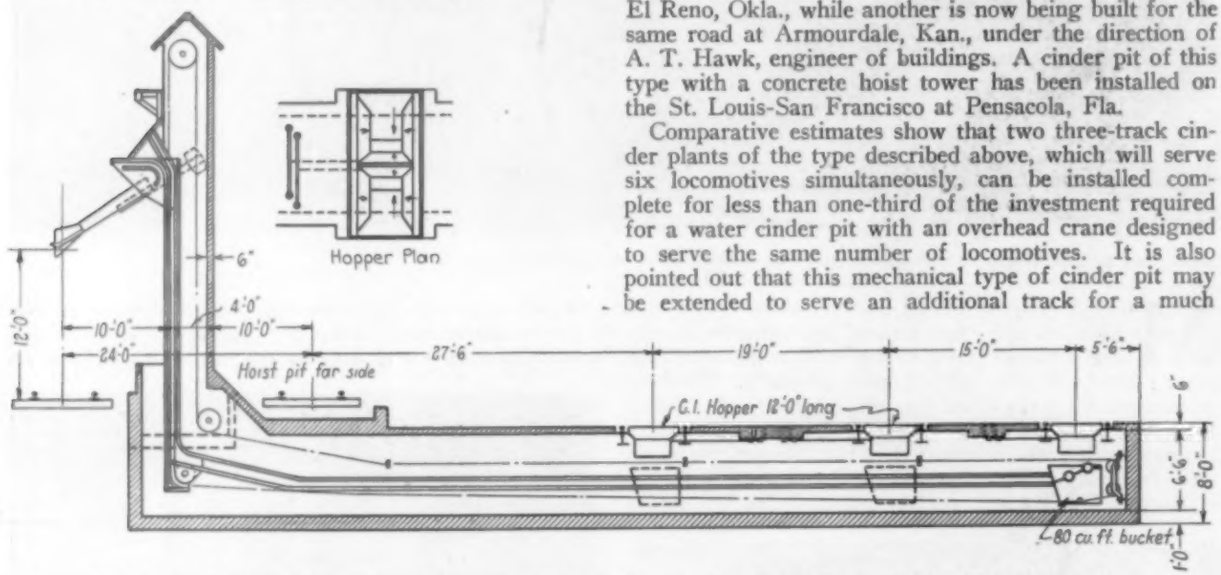
The ash bucket has a capacity of 80 cu. ft. and is constructed of 5/16-in. copper-bearing metal throughout, supported by a forged steel yoke with chilled cast iron wheels that run on the angle iron rails mentioned above. The dimensions of the bucket are such that the maximum depth of the pit need be only 6½ ft., which enables it to drain by gravity to a sewer which in this location was 7 ft. below ground.

The bucket is moved along the tunnel and hoisted up and down the tower by means of duplicate ½-in. cables that extend along each side of the tunnel. These cables are in the form of continuous loops extending between sheaves at the top of the tower and the far end of the tunnel so that the cables serve for moving the bucket in each direction. These cables are actuated by drums direct-connected to hoisting machinery located in a concrete compartment at the base of the tower. This equipment consists of a 15-hp. elevator-type motor and brake, with a silent chain drive to a steel cut gear reduction running completely encased in oil. One of the two hoist drums is adjustably keyed to the shaft so that it can be adjusted readily to correct any inequality in the stretch of the cables attached to either side of the ash bucket.

The cinder plant at Kansas City serves two locomotive tracks, namely, an inbound lead and an outbound lead, these tracks being spaced 20 ft. center to center with a crossover between them so that inbound locomotives may be spotted over the hoppers provided in each track. The ash car track is located 20 ft. from the center of the nearest locomotive track thus affording full main line clearances in accordance with a recent legislative enactment in the state of Missouri.

The coaling station was designed and installed by the Ogle Construction Company, Chicago, under the direction of F. G. Jonah, chief engineer of the St. Louis-San Francisco. A similar installation was recently placed in service on the Chicago, Rock Island & Pacific at El Reno, Okla., while another is now being built for the same road at Armourdale, Kan., under the direction of A. T. Hawk, engineer of buildings. A cinder pit of this type with a concrete hoist tower has been installed on the St. Louis-San Francisco at Pensacola, Fla.

Comparative estimates show that two three-track cinder plants of the type described above, which will serve six locomotives simultaneously, can be installed complete for less than one-third of the investment required for a water cinder pit with an overhead crane designed to serve the same number of locomotives. It is also pointed out that this mechanical type of cinder pit may be extended to serve an additional track for a much smaller added cost than would be necessary to enlarge a water cinder pit to obtain additional capacity.

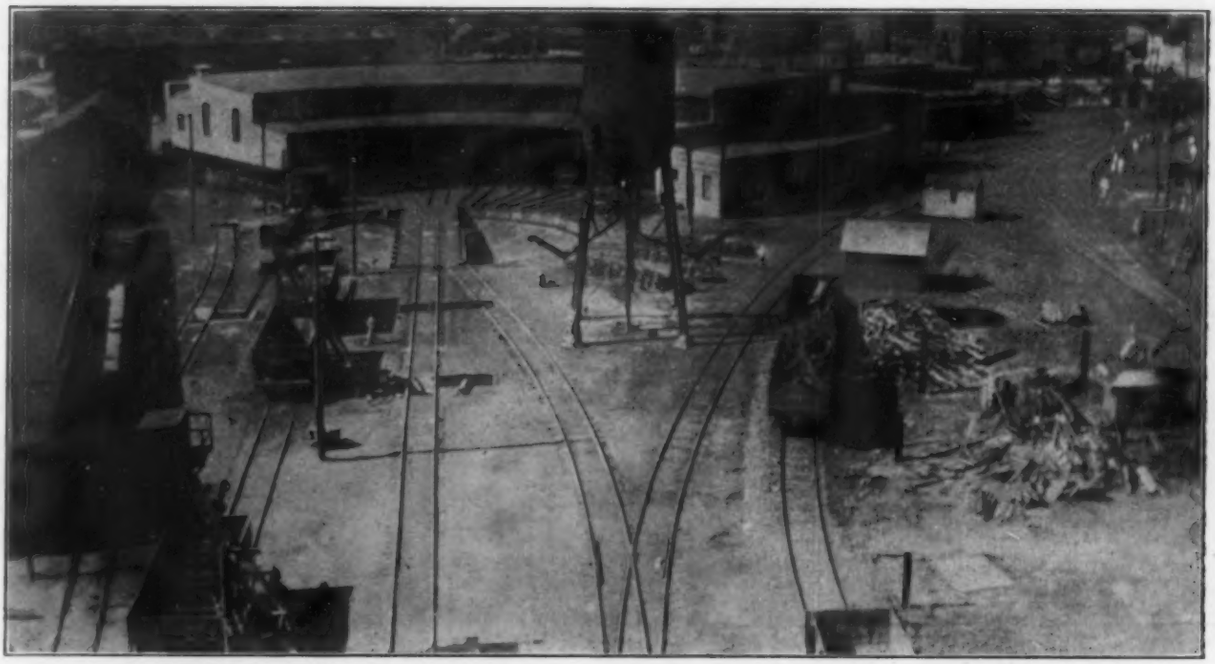


A Longitudinal Section Through the Tunnel and Tower of a Three-Track Mechanical Cinder Pit

Wide World

Two B. & M. Locomotives Which Salvaged a Submarine

Sunk near Portsmouth, N. H., two years ago, the submarine was pulled ashore by these locomotives. Locomotives traveled ⅛ mile and submarine only 400 ft. by reason of block and tackle connection. Truck in photograph contains portable telephone connection with the shore, ¼ mile distant.



The Approach to the Enginehouse

Central of Georgia Builds New Engine Terminal

Modern facilities are provided at Albany, Ga., to meet the demands of increased traffic and to effect economies

By S. A. Elkan
Assistant Engineer, Central of Georgia

THE Central of Georgia recently completed and placed in service a modern locomotive terminal at Albany, Ga., as part of a comprehensive program of improvements which embraced the virtual rebuilding of its facilities at that point. The necessity for this improvement may be understood readily when the growth of business and the corresponding increase in the number of locomotives to be taken care of is considered. During 1922, the average number of locomotives handled monthly average 569, with weights ranging from 67 to 224 tons, while for the first nine months of 1926, the monthly average had increased to 902, and the maximum weight to 305 tons. During March of the same year a total of 1,028 engines were handled.

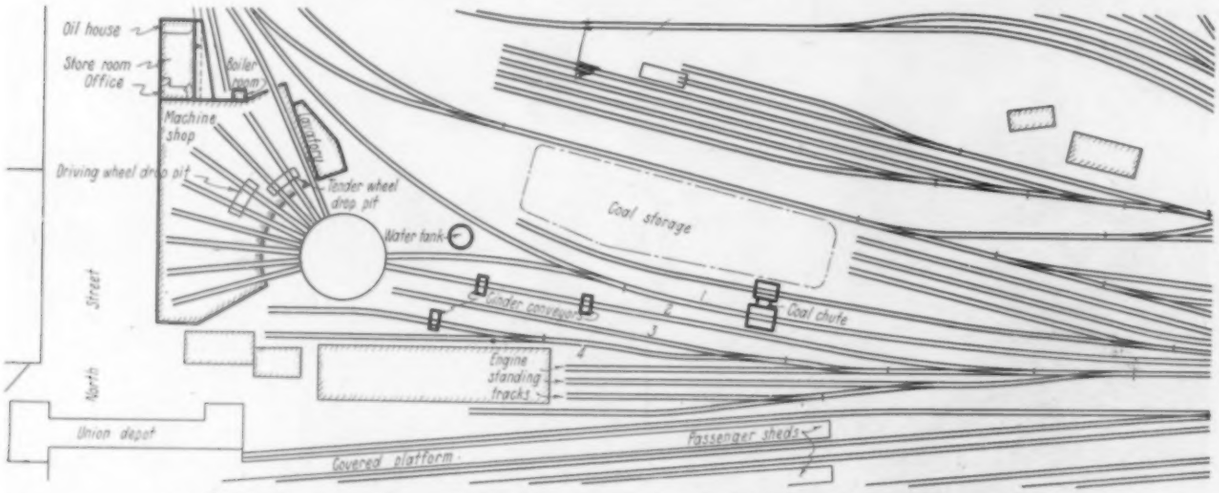
Under the old arrangement, fires were cleaned over a small depressed pit and the cinders were loaded by hand labor; engines were coaled from an elevated wooden platform, located about one-half mile from the enginehouse, the coal being shoveled into one-ton buggies and pushed to the edge of the platform where they were dumped into the tenders; and the engines were turned on an 85-ft. balanced turntable, operated by an electric tractor. It was impracticable to make any but the simplest repairs to locomotives in the former enginehouse, due to the fact that only two of the tracks had engine pits, that none of the tracks were equipped with drop pits and that there were practically no modern machine tools.

The New Layout

The main units of the new terminal include a nine-stall brick and timber enginehouse with a machine shop in the same building and with a storehouse, oil house, boiler room and lavatory connected therewith; a 300-ton reinforced concrete, electrically-operated coaling station, with a sand plant and ground storage for 4,000 tons of coal; and three electrically operated "N & W" Junior type cinder handling plants. These different facilities are so designed and located in such sequence as to permit the locomotives to be cleaned rapidly and economically, coaled, inspected and prepared for the road with the fewest possible movements of the engine. The accompanying plan of the layout shows how this was accomplished.

A locomotive coming to the house approaches on track No. 2, stopping at the coaling plant to take coal and sand; it then advances to one of the two cinder pits on the same track, and the fire is cleaned, after which it passes over the turntable to one of the stalls of the enginehouse where it is inspected and any necessary repair

work is done. On leaving the house the engine takes water at the water tank if it is to go out on the road at once; otherwise it is placed on one of the four standing tracks located to the east of the enginehouse leads; when it is called for the road it can take water from a 10-in. double-hung sash and creosoted frames. The wall at the east end of the building is of corrugated asbestos to within eight feet of the ground, so that, as occasion demands, the building can be extended without the necessity of removing a permanent wall. The climatic



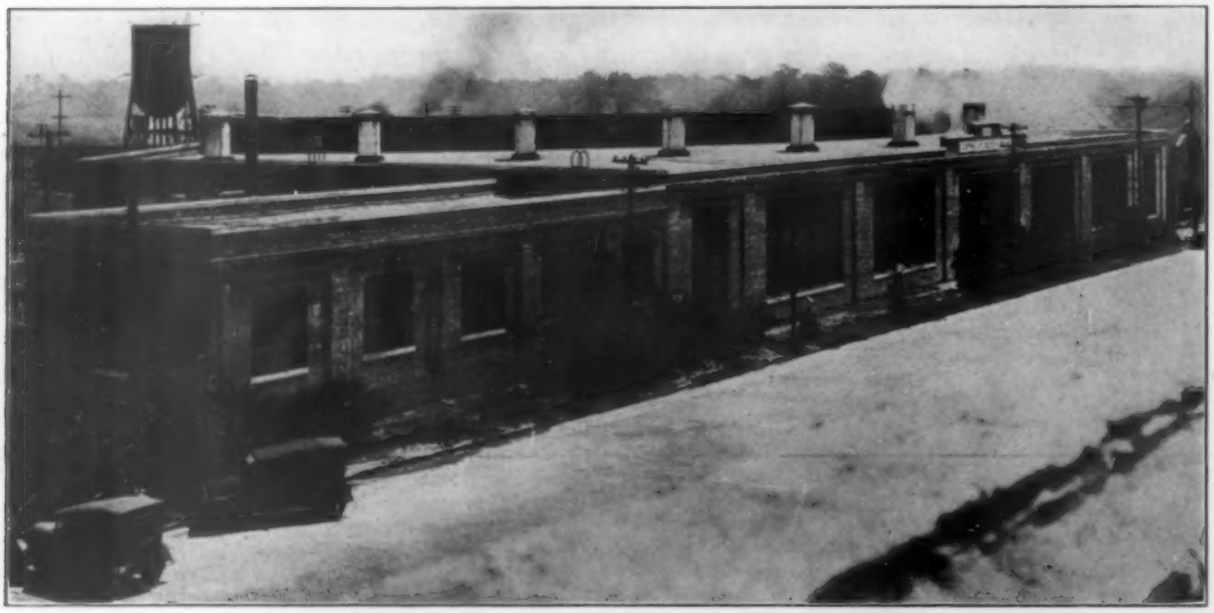
Engine Terminal Layout at Albany, Ga., with New Facilities Shown by Heavy Lines

water column located on the lead to the standing tracks.

Attention Was Given to the Appearance of the Enginehouse

More than ordinary consideration was given to the appearance of the enginehouse since its back wall is adjacent to one of the principal streets of Albany and is near the passenger station. To this end, and also to secure extra space of approximately 2,400 sq. ft., for use as a machine shop, the back wall is straight instead of curved and extends along the north line of the street. This wall is of brick, with reinforced concrete window sills and coping, and the spaces between the pilasters are composed almost entirely of windows, with creosoted, double-hung sash and creosoted frames. The wall at the east end of the building is of corrugated asbestos to within eight feet of the ground, so that, as occasion demands, the building can be extended without the necessity of removing a permanent wall. The climatic conditions at Albany are such that no doors are needed in front of the stalls, hence this end of the building is left open as is also the lower eight feet of the east end wall.

The roof of the structure is of heavy timber construction, supported on 10-in. by 10-in. and 12-in. by 12-in. wood posts on concrete footings. The girders for the short spans are 12-in. by 18-in. long leaf yellow pine, while those for the longer spans are steel I-beams. All timber and lumber that is exposed to the weather in any way has been creosoted.



The Back Wall of the Enginehouse Adjoins a Principal Street

The floor of the enginehouse is of creosoted wood blocks laid on a five-inch base of reinforced concrete and with sufficient crown between the pits to facilitate the

run-off of water. Expansion joints are provided along all walls and around all posts and engine pits. The joints for the latter are one inch wide by three inches deep and are filled with pitch, while the joints along the walls are 2½ in. wide by 3 in. deep, filled with 2 in. of Kentucky rock asphalt on 1 in. of pitch. It is believed that these joints will be sufficient to prevent any buckling of the floor from either heat or water.

The Engine Pits

The engine stalls are 92 ft. long under shelter and each is provided with a reinforced concrete engine pit, 83 ft. long by 3 ft. 9¾ in. clear width, and varying from 2 ft. 6 in. to 3 in. deep. The bottoms of the pits are crowned in the center along the entire length of the pits and slope toward the front to facilitate drainage.

The Interior of the Enginehouse Is Well Lighted

The pits are of such length that the largest engine can be entirely under shelter without fouling adjacent tracks, and there is ample space between adjacent pits to permit the free handling of material and equipment. Drop pits for driving wheels are located on tracks No. 3 and 4, and for tender wheel on tracks No. 1 and 2, the rails of the engine pits being carried across the drop pits on sliding and swinging beams to facilitate handling. Compressed air is piped to each drop pit and engine stall from a compressor located in the machine shop portion of the building, which also supplies air to the car repair yard and to the coal chute for blowing dry sand to the storage bin. Each engine pit is supplied with a water connection for washing boilers and with receptacles for electric light and power tools.

Asbestos smoke jacks of the square type are used, and these, together with the louvre ventilators in the monitor, the open inner circle and the opening in the east end wall, afford ample ventilation and keep the building freee from smoke and fumes. The open inner circle and the large window area in the back wall assure ample natural light and to aid in distributing the light the ceiling and all posts and interior walls are painted white from a point six feet above the floor. The paint used is made of calcium carbide from the railway's acetylene plant, together with bluing and salt, and as it can be applied economically it is renewed as frequently as necessary to maintain satisfactory lighting. Artificial light is supplied by three rows of electric lights, fitted with shallow bowl reflectors.

The capacity of the turntable was greatly increased by converting it from the balanced type to a three-point bearing table, which was accomplished by installing roller bearings in such a manner as to bring the wheels in contact with the circle rail. An additional electric tractor was installed to insure easy uniform operation with the heavier engines.

The Machine Shop and Auxiliary Buildings

The machine shop is located in the southwest corner of the enginehouse and includes the one 500 cu. ft. synchronous motor-driven air compressor, one 24-in. by 8-in. engine lathe, one 14-in. by 6-in. engine lathe, one 3-in. radial drill, one 2-in. bolt cutter, one 18-in. by 3-in. double floor grinder, one 75-ton hydraulic bushing press, one 37-in. scraper and one forge. Each machine is driven by an individual motor.

A building containing the general foreman's office, the storeroom and the oil room adjoins the enginehouse on the west, and is of the same type of construction except that the floor is of troweled concrete and that the oil room has a concrete roof and steel window sash. The oil room is separated from the store room by a fire wall with fire doors. Oils and paints are stored in steel tanks, each equipped with a measuring pump.

The Boiler Room

The boiler room adjoins the enginehouse on the west, north of the store room, while the locker and lavatory building is adjacent to the north wall. Separate rooms, each containing showers, lavatories, toilets and steel lockers, are provided for the white engineman, white shopmen, colored enginemen and colored shopmen.

The enginehouse and auxiliary buildings were designed by the engineering department of the Central of Georgia and were erected by Joseph E. Nelson & Sons, Chicago, at a cost of approximately $125,000. The coal chute of the chain bucket type serving two tracks with coal and sand, was designed and constructed by Fairbanks, Morse & Co., Chicago at an approximate cost of $40,000. The three cinder conveyors were designed and furnished by the Roberts & Schaefer Company, Chicago, and erected by the railway company, at a total cost of about $12,000.

Ewing Galloway

Bridge on White Pass & Yukon Railway, Alaska

Feeding the Railway System of South Africa

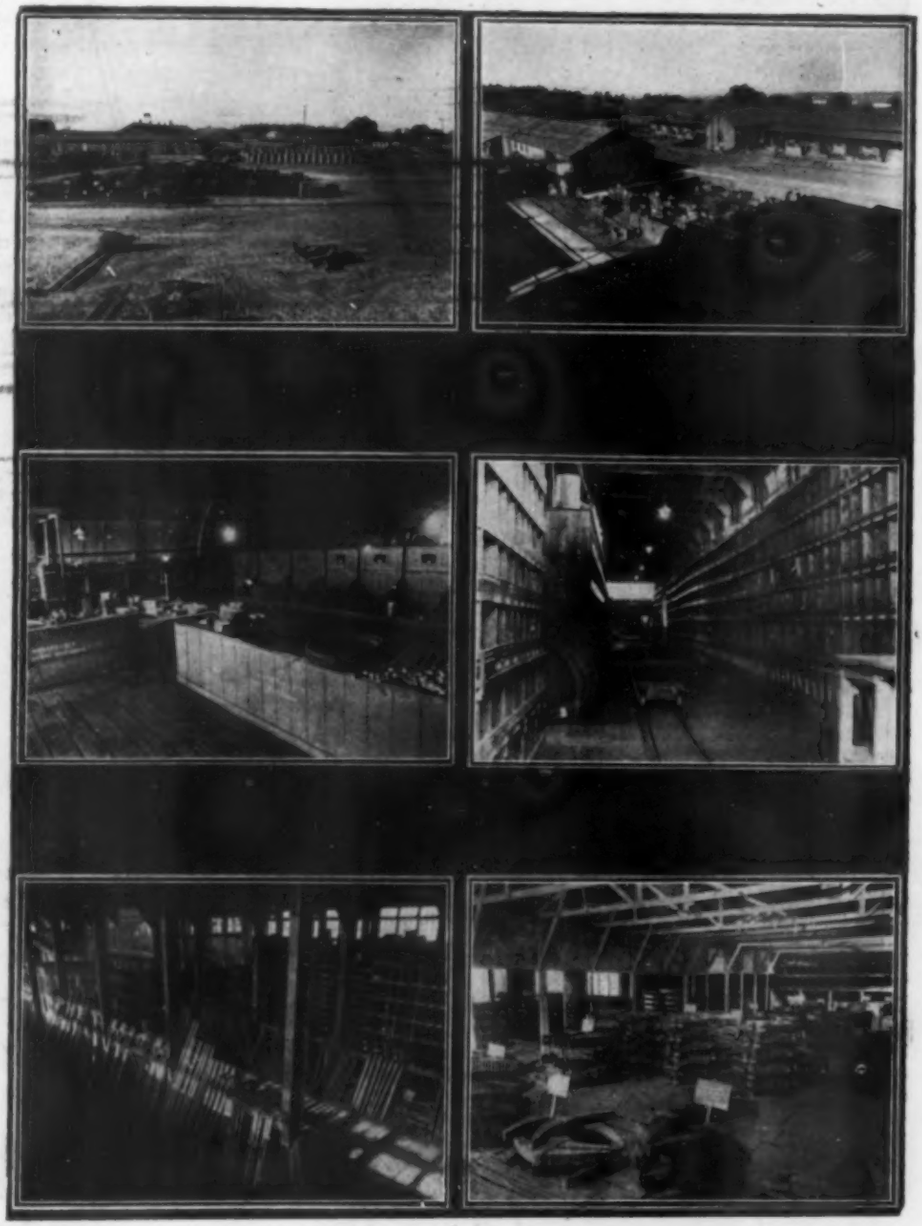
*Gap of 6,000 miles between sources of material and consumption a feature of supply work in this land**

RAILWAY stores departments in the United States and Great Britain have their sources of supply at hand, but South Africa is 6,000 miles from Europe—the main source of supply. This necessitates estimating requirements 6, 9, and 12 months ahead. There is the further requirement of having to call for tenders in South Africa as well as overseas, which must then be submitted to a Tender Board, and the final approval of the Administration obtained. These regulations are designed for the protection of public interests and for the furtherance of South African business, but they make the difficulties of the stores department much greater than those pertaining to the work of similar departments in America or Europe.

Large Expenditures

Some idea of the magnitude of the department's operations may be gathered from its turnover for the financial year 1924-25, which amounted to $108,969,000,† while the value of stores and material held by the department in its various warehouses and yards ranged from $10,000,000 to $10,250,000. The percentage of the expense of running the department to the value of stores issued is only 3¼ per cent. In all, the department employs a staff numbering 2,122 individuals. These include 444 employed in a supervisory and clerical capacity, 506 Europeans in the warehouse section and the yards, and 1,172 natives and colored employees. The material handled comprises almost everything from an engine to a pin and from a needle to a steamship. There is hardly a branch of activity in the engineering and commercial world that is not dealt with by the stores department of the South African Railways and Harbours.

The headquarters of the stores department are at



Bloemfontein Stores

Top: Views of Yard. Center (left): Electrical and Telegraph Material and Bolts. Bottom: Locomotive Parts.

*Adapted from South African Railways & Harbours Magazine—The South African Railways and Harbours is a government system comprising 11,477 miles of railway line, principally of 3-ft. 6-in. gage, and 1,797 locomotives, 3,060 coaches, and 33,326 freight cars of this gage.

†In expressing values in this article, the pound sterling is taken to equal five dollars.

Johannesburg under the control of the chief storekeeper. In the headquarters establishment are accounting, replenishment, buying, contracting, sales and staff sections. Depots are established at various centers in the Union, and also in the South-West Protectorate, for the purpose of warehousing and issuing stocks in wholesale and retail quantities. These depots are in charge of storekeepers, district storekeepers, and clerks-in-charge, according to the importance of the establishments.

The services entail the replenishment, purchasing, receiving, custody, issue and accounting for stores and material required for the railway. Replenishment of stocks of ordinary stores is the sole responsibility of the stores department. Technical spares, such as locomotive and wagon (car) parts, etc., are replenished in collaboration with technical departments; permanent way material ordered after consultation with the chief civil engineer.

Stores warehouses are situated at nine centers. In addition, the department at present controls 18 sub-depots for the purpose of serving the transportation sections with material required in connection with running engines and rolling stock and for minor repairs thereto. Additional depots are being taken over from the transportation department.

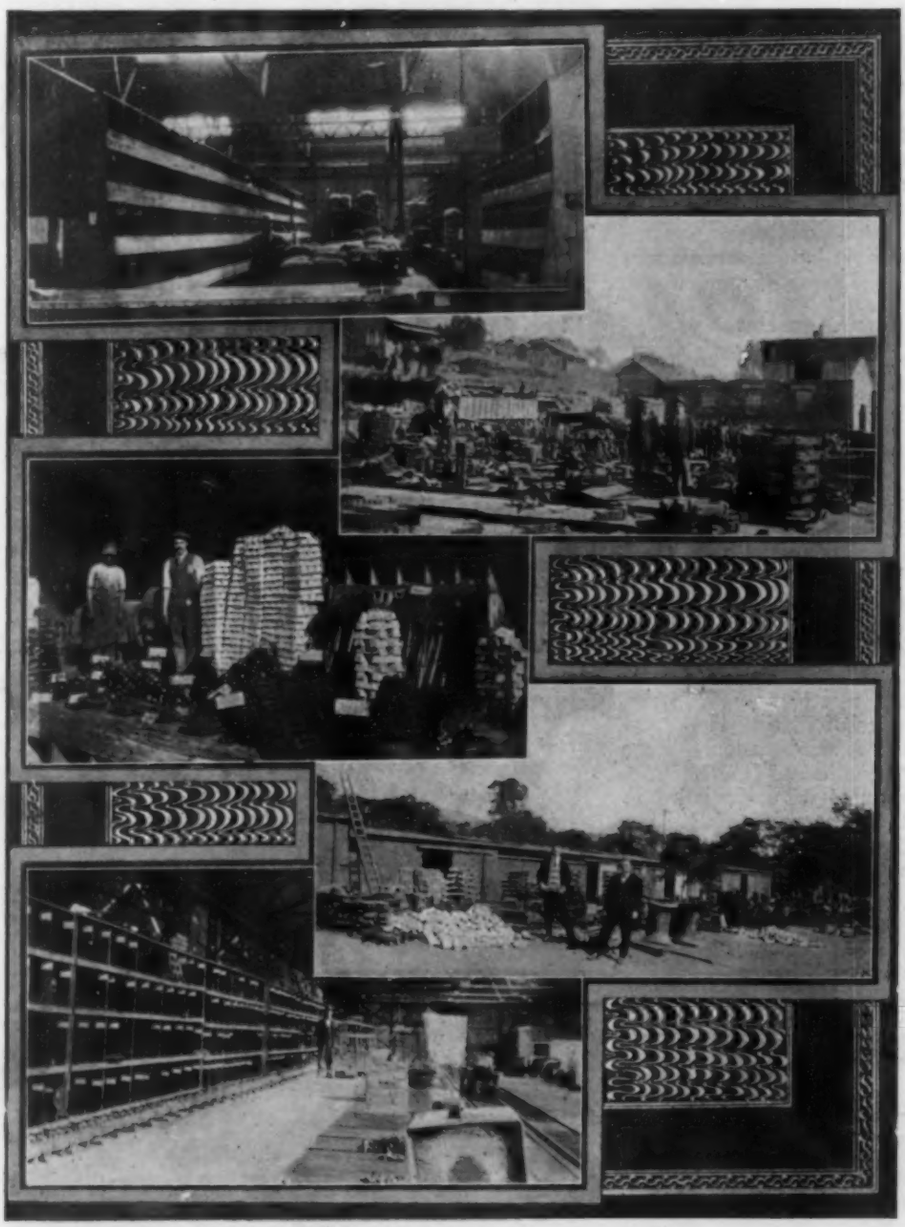
Records of Consumption Kept

The replenishment of stocks is based mainly upon forms upon which are shown the past 12 months' issues for the current year up to the date of preparing the forms, stock on hand, stock under order and not received, and additional requirements for the ensuing year or surplus stock for transfer to other depots. There are over 90 classes of stock replenishment by forms which cover thousands of items and are worked to a time schedule. As only a certain number of lines can be dealt with monthly, replenishment is carried out from January down to November in each of the years.

Replenishment forms are prepared by the respective storekeepers, who are responsible to the chief storekeeper for the necessary information as to requirements. The forms are then passed to the master mechanic who, in conjunction with the storekeeper, decides as to what additional requirements are necessary or what surplus can be declared. The figures are usually arrived at from the past year's issues, after taking notice of any approved policy known to the storekeeper or the mechanical engineer. All completed forms are sent to the chief storekeeper, who has all the figures checked. All requirements of technical material are eventually tabulated and submitted to the chief mechanical engineer of the South African Railway system.

Articles of a general nature which are readily obtainable locally are replenished quarterly. The additional requirements are generally determined by the storekeeper, based on past issues.

Inquiry forms are then sent to the chief storekeeper, surplus control section, to ascertain if any other depot can spare any of the articles required or offer substitutes. Articles that cannot be supplied from stocks at other depots are then placed on lists for purchase.



Pretoria Stores

Top to bottom: Corner of the Main Store. Corner of the Reclamation Yard. Some Results of Reclamation Work, Foundry Store, Engine Parts Section.

In order to provide for stocks which may run out prior to the date when the quarterly review falls due, storemen are provided with interim forms on which they enter particulars daily of any item of stock, which, in their opinion, necessitates immediate replenishment. The stock replenishment section deals immediately with such items. Those lines of stock which are dealt with in the chief storekeeper's office on the 12 months' basis are also subject to a six months' review, and any additional quantities which it is anticipated will be required are submitted on interim forms for the purpose of purchase.

25,000 Items of Stock

Some depots carry upwards of 25,000 items of stock and the amount of detail work is large. Close scrutiny is essential in order to insure that stocks are kept up to the requirements of the service, and on the other hand to guard against the accumulation of surplus stocks.

Storekeepers are responsible for payments made for their own depots, for accounting for the business transacted and for rendering monthly balance sheets to the chief storekeeper. Materials supplied to the various departments are debited to such departments and invoices are forwarded as in ordinary business transactions. The system of bookkeeping is similar to that in use in commercial houses, but modified to meet the railway requirements. One of the functions of the department is to arrange for the disposal of all unserviceable scrap material, and such material is forwarded by the various sections to the stores warehouses.

Buy Through African Agencies

When the Administration is in the market for material, tenders are invited:—

(a) Through the medium of the press, in the case of large requirements.

(b) By informal tender, in the case of material of over $500 in value.

(c) By notification on lists posted on notice boards in railway buying offices, public railway buildings, and on notice boards in commercial exchanges, of items mentioned in clauses (a) and (b).

In connection with the purchase of supplies, it is the policy of the government to obtain the requirements in South Africa or through South African agencies, and accordingly tenders are called for in South Africa, with the result that South African merchants and South African agents have opportunities of sharing in the extensive business offered by the Administration. Some idea of the extent of this may be gathered from the fact that during the last year contracts were entered into with South African merchants to the value of $1,347,740, while the total value of material purchased by the department in the Union amounted to $22,056,525.

The total value of material obtained direct from overseas amounted to $23,444,270, included in which is the cost of the following important items:—

Material for electrification of the line between Glencoe and Pietermaritzburg	$6,457,200
Permanent way material and bridge work	4,809,925
Rolling stock and spare parts	5,115,430
Machinery	478,770
	$16,861,325

The following particulars showing the principal lines of material purchased and received for the financial year 1924-25, illustrate the volume of supplies necessary for equipping and running the service.

Material	Financial Year 1924-1925
Boots and shoes	$3,810
Brake gear	308,870
Bridge work	214,405
Cement	1,025,910
Clothing and uniforms	209,825
Commissary	368,475
Coal	4,190,815
Copper	152,795
Iron and Steel	1,052,410
Other metals	832,610
Iron (galvanized, corrugated and sheet)	155,150
Coke	24,300
Drugs	58,675
Electrical material	611,955
Explosives	53,290
Fencing	105,025
Forage and provender	137,135
Live stock	43,300
Machinery	687,735
Oils	815,340
Provisions and rations	666,635
Piping	358,785
Rolling stock	3,963,695
Locomotive and car parts	5,204,700
Rope	140,310
Stationery	396,750
Timber	1,591,660
Signal and telegraph material	122,850
Tarpaulins	1,005
Varnish	28,520
Waste, cotton and wool	190,115
Rails and fastenings	4,402,305
Ties	4,294,745
Grain elevator material	221,045
Motor cars, tractors, and spares	70,750
Electrification material	6,457,200
General stores	11,395,030
Tugs	92,785
Total	$30,501,795

The above figures include $8,404,155 worth of South African products.

The cost of operating the stores department is recovered from the various consuming departments by adding a percentage to the value of stores issued. The rate is assessed only in the case of material obtained and supplied to departments through stores depot warehouses.

The department supplies all uniform clothing. For the transportation departments there are over 80 different classes of officers and employees to be uniformed, while the harbor department includes 53 and the commissary department 15 different types of uniform or dress. Uniforms include those for station masters, station foremen, district inspectors, ticket examiners and collectors, shunters, porters, signalmen, lift attendants, police inspectors and constables, permanent way inspectors, and many others, while special garments have to be supplied for the use of drivers, firemen, carriage and wagon examiners, gangers, shedmen, etc. The harbor requirements include uniforms for port dock masters, baggage masters and others; while comprised in the list for the commissary department are dress suits for chief stewards, waiters, etc.

Underwood & Underwood

Group of Railway Executives in Omaha at Dinner in Honor of Carl Gray

Accident Investigations, Fourth Quarter, 1926

THE Interstate Commerce Commission has issued bulletin No. 30 containing its summary of train accident investigations for the three months ending with December, 1926; 21 collisions, and four derailments.

Following is a list of the cases investigated, the numbers at the left being those of the government record:

Train Accidents Investigated—October-December, 1926

1295.	Yazoo & Mississippi Valley	Greenville, Miss.	Oct. 2	C
1296.	Southern	Hicks, Tenn.	Oct. 4	C
1297.	Virginian	Rock, W. Va.	Oct. 6	C
1298.	N. Y. Cent. and Mich. Cent.	Gibson, Ind.	Oct. 7	C
1299.	Cincinnati, N. O., & Tex. Pac.	Williamstown, Ky.	Oct. 15	D
1300.	Pennsylvania	Toledo Jct., Ohio	Oct. 24	C
1301.	Atlanta, Birmingham & Atlantic	Deerhurst, Ala.	Oct. 27	D
1302.	Atlantic Coast Line	Blanton, Fla.	Oct. 28	C
1303.	Chic., Mil. & St. Paul	Davenport, Iowa	Oct. 29	C
1304.	Southern	Kingville, S. C.	Oct. 30	C
1305.	Michigan Central	Goodison, Mich.	Nov. 4	C
1306.	Pennsylvania	Millersburg, Pa.	Nov. 5	C
1307.	Missouri Pacific	Leeper, Mo.	Nov. 9	C
1308.	Union Traction Co., Ind.	Poneto, Ind.	Nov. 16	C
1309.	Louisville & Nashville	Hendersonville, Tenn.	Nov. 16	D
1313.	Louisville & Nashville	Fountain Head, Tenn.	Nov. 16	C
1310.	N. Y. Ch. & St. L.: Penn.	Fort Wayne, Ind.	Nov. 16	C
1311.	Northern Pacific	Lake Park, Minn.	Nov. 20	C
1312.	Southern	Moy, S. C.	Nov. 20	D
1314.	New York Central	Syracuse, N. Y.	Nov. 29	C
1315.	Louisville & Nashville	Mobile, Ala.	Dec. 16	C
1316.	Southern	Rockmart, Ga.	Dec. 23	C
1317.	Chicago, Ind., & L.; N. Y. Chicago & St. Louis	Frankfort, Ind.	Dec. 26	C
1318.	Chic., St. Paul, M. & O.	Chippewa Falls, Wis.	Dec. 30	C
1319.	Lehigh Valley	Rummerfield, Pa.	Dec. 30	C

The October investigations were abstracted in the *Railway Age* of April 16, page 1209.*

Following are the 13 collisions and two derailments investigated in November and December:

November Accidents

Michigan Central, Goodison, Mich., November 4.—5:20 p. m.—Southbound freight train extra 7827 standing a short distance north of the signal at the station, was run into by northbound passenger train No. 205, moving about 40 miles an hour, which had run past the (manual) block signal. The fireman of the passenger train was killed and 20 passengers, nine employees and seven other persons were injured. The main blame is placed on the freight for attempting to clear for the passenger train at Goodison without sufficient time from the last station, five miles away. The engineman made various excuses and explanations, but the inspector holds that he did not begin soon enough to apply the brakes; and he ran past the switch at which he should have entered the siding, about 3700 ft. north of the point of collision. The conductor of the freight is held at fault for not riding on the locomotive so as to insure proper entrance to the siding at Goodison, the front brakeman being inexperienced. The engineman of the passenger train had depended upon his fireman (who was killed) to call the indication of the block signal at Goodison, and did not himself look at the signal until quite close to it; but the report, in reciting this fact, has nothing to say about the degree of culpability chargeable against the engineman.

Pennsylvania, Millersburg, Pa., November 5, 1:27 a. m.—Westbound freight extra 3012, (100 empty coal cars) moving at full speed, collided with eastbound freight extra 3608, which was just entering the main line from the Lykens branch and was moving at very low speed. A dozen cars were wrecked and the engineman of the eastbound and the front brakeman of the westbound train were killed; five employees injured. The engineman of the westbound train had ignored distant and home signals set against him, and admitted that after passing the distant signal and coming within view of the mast of the home signal, he remembered nothing further and believes he must have suddenly fallen asleep. The conductor of the eastbound train, who was on the ground, gave stop signals with his white lantern but the engineman claimed that he thought these were intended for some other crew. The fireman of the westbound train was able to throw no light on the engineman's behavior. Both he and the engineman claimed that the distant signal was clear but the evidence is conclusive that it was not.

Missouri Pacific, Leeper, Mo., November 9.—Work train extra 2511, moving southward at very low speed was run into by northbound freight No. 94, moving at from 10 to 20 miles an hour, wrecking the caboose of the work train and doing much other damage. A laborer in this caboose was killed and two other employees were injured. The work train was moving against an opposing superior train without flag protection; but the northbound train was also at fault, having passed an automatic signal giving only permissive indication. The conductor of the work train had given incomplete instructions to his flagman and neglected to inform the engineman what instructions he had issued.

Union Traction Company of Indiana, Poneto, Ind., November 16, 5:15 a. m.—Collision between electric trains—southbound freight extra 604 and northbound freight extra 49—both trains being very short; five employees injured. Fire broke out immediately after the collision and the wreckage was consumed, except the rear car of the northbound train. The motorman of No. 49 had fallen asleep approaching the point where (according to a dispatcher's order) he should have waited for the southbound train, *after he had seen the headlight of the opposing train* some distance away. The conductor was in the compartment adjacent to the motorman, and was engaged in clerical work.

Louisville & Nashville, Hendersonville, Tenn., November 16.—Southbound passenger train No. 99 was derailed by striking an automobile at a crossing and 12 passengers and four trainmen were injured. This accident was reported in the *Railway Age* of January 15, page 242; and the collision of track cars resulting in the death of six trackmen and the injury of 14, following the Hendersonville accident, was also reported at the same time.

New York, Chicago & St. Louis, Fort Wayne, Ind., November 16.—An eastbound passenger train ran into a freight train of the Pennsylvania at the intersection of the two roads and three employees were injured. This collision was reported in the *Railway Age* of January 8, page 209.

Northern Pacific, Lake Park, Minn., November 20, 2:25 a. m.—Eastbound passenger train No. 8 consisting of a locomotive and 10 cars, standing at the station, was run into by following passenger train No. 4 consisting of two locomotives and 13 cars; and the rear car of the standing train, a wooden business car, was crushed for a length of about 20 feet. The general baggage agent of the road, who was riding in this car, was killed. Not much damage was done to other cars. Train No. 4, within the last few miles, had passed two or three automatic block signals at caution, one signal clear and then another one at caution but finally ran past the stop signal about 1,100 ft.; and the responsibility is placed on the engineman of the leading engine of this train. He simply did not apply brakes soon enough, being unfamiliar with passenger speed. This engineman had been in service about 20 years, and yet had been so averse to running passenger trains

* For the reports of earlier months, see *Railway Age,* April 2, page 1062.

that he had signed away his right of priority and had in all his life operated an engine in passenger service no more than four or five times. This being the case, the inspector says that he should not have been employed in this service at all. The flagman of No. 8, who had been informed that his train was to be passed by No. 4 at Lake Park, got off the train promptly, when it stopped, and started back; but No. 4 was almost within sight of him, and he is held to have done about all that he could have been expected to do.

Southern, Moy, S. C., November 20.—Westbound passenger train No. 11, first section, moving at about 40 miles an hour, was derailed at a facing point switch which apparently had been run through by a train moving in the opposite direction, and one of the two locomotives drawing the train was overturned. The engineman of this engine and the fireman of the other were killed, and three passengers and three employees were injured. The inspector was unable to determine how the switch came to be open or what train had run through it. The switch lock was found lying on a sleeper.

New York Central, Syracuse, N. Y., November 29.—Collision of yard trains, resulting in the death of one employee and the injury of one. The conductor and a brakeman, of engine 692, made a back-up movement without ascertaining definitely that the route was clear.

December

Louisville & Nashville, Mobile, Ala., December 16, 1:25 a. m.—Light engine 235, bound from the engine track to the passenger station, was moved on to the main track immediately in front of northbound passenger train No. 2, and the locomotive and tender of the passenger train were overturned. No. 2 was traveling at about 15 or 20 miles an hour and its engineman and fireman were killed. One other employee was injured. The responsibility was placed on the engineman of No. 235, who knew that No. 2 was due, yet took no action to protect himself by flag. It is not known whether the fireman of No. 2 was maintaining a proper lookout, but the inspector finds no reason to blame either him or the engineman. They were within yard limits and subject to Rule 93. Rule 93 requires switchmen to carry standard watches and to have in their possession a time table, but it was found in the investigation that Engine Herder Dees, regularly moving engines between the engine track and the station, had no time table and did not know whether his watch was a standard watch. It appears also that Dees had been allowed to run locomotives on the main track on the time of delayed passenger trains with only oral permission, given through the yardmaster.

Monon and Nickel Plate, December 26, 12:10 a. m.—Crossing collision between a northbound freight of the Chicago, Indianapolis & Louisville and a westbound locomotive of the New York, Chicago & St. Louis at the intersection of the two roads at Frankfort, Ind., resulting in the death of the fireman of the westbound locomotive. This crossing has no standard interlocking and all trains are required to stop before passing over; but on both roads the space limit, within which the stop must be made, is stretched, apparently without legal authority, to recognize stops at the station, more than 700 ft. from the crossing, as complying with the law which requires the stops to be made within 500 ft.

Parallel with the Nickel Plate road is a line of the Lake Erie & Western, the two roads having five tracks; and for these five tracks a single signal gives a proceed indication for either or both directions on any one of the tracks. From either the south or the east, the runners of approaching engines have only about 100 ft. in which to see trains on the other road. The signal can be changed instantly by the signalman at any time, though there is a rule forbidding him to take a signal away from an approaching train until after the train shall have been brought to a stop. Northbound freight No. 90, with only two cars (the rest of the train having been cut off at the station), ran into westbound locomotive 745, overturning it, but doing no great damage to either. The testimony was not very clear and the targetman made conflicting statements, but the conclusion is that he gave a proceed indication to the Monon engine without waiting until the Nickel Plate engine was brought to a stop. It is believed that when the Monon engineman sounded his whistle to call for the crossing, the targetman overlooked the fact that the other engine was closely approaching. The report says that all of the employees involved were experienced men and that they had not worked illegal hours; but nothing further is said about the targetman nor anything about the absence of standard interlocking protection for the crossing.

Chicago, St. Paul, Minneapolis & Omaha, Chippewa Falls, Wis., December 30, 1:23 a. m.—Southbound passenger train No. 310, moving at from 15 to 25 miles an hour, ran into the rear of a preceding freight, which had been stopped because too heavy to ascend a grade. The passenger engine demolished the caboose of the freight and then mounted and came to rest, right side up, on a loaded gondola car. With the exception of the tender, no other vehicle was derailed or damaged. The conductor of the freight, resting in the caboose, was killed, and two passengers and two employees were injured. This report fills seven pages and recounts a good deal of contradictory testimony. The freight had been standing at this point some time and the conductor had been lying down in the caboose, but whether or not he was asleep is not clear. He and the flagman are held primarily responsible, through the passenger train under manual block signal rules, had received a caution card requiring speed to be kept under control. The report, however, has no censure for the engineman except to say that "it is not believed that he is entirely blameless; * * * had the requirements of the caution card been a little more strictly observed, it is probable that the collision would not have occurred." The flagman of the freight admitted that he had not thought anything about the passenger train since he left Bloomer, about 11 o'clock. When the engineman signaled him to go back, he used up 10 or 15 minutes because of deep snow, but the inspector finds that the snow was not very deep. The freight had been delayed in attempts at starting because, repeatedly, the hand-lantern proceed signals given by the flagman were, according to his testimony, mistaken for stop signals.

Lehigh Valley, Rummerfield, Pa., December 30, 6:55 a. m. Westbound freight extra 2111, moving at 35 or 40 miles an hour, ran into the rear of a preceding freight, extra 461, making a bad wreck and resulting in the death of the engineman and the fireman of 2111; one other employee was injured. The responsibility is placed on the engineman and fireman of 2111, both of whom were killed. This train had passed automatic signals, cautionary and stop set against it, the stop signal being 9050 ft. east of the point of collision. The flagman of 461, with witnessses to support him, said that he had put down torpedoes as a warning to 2111 and that he heard them explode, but no effort was made to stop the train. The fireman could have seen the lights of the leading train a long distance, and the engineman could see them for a considerable distance. A brakeman on 2111 said that he did not hear any torpedoes but that possibly the noise of the stoker had prevented that.

Illinois Central Trains Its Dining Car Employees

GOOD food and competent service usually give passengers a favorable attitude toward the railroad on which they are riding and dining. In addition, it is necessary that a railroad render excellent dining car service if it is to receive returns in the way of good will from the large investment in dining cars and their equipment and supplies.

With these ideas in mind, many railroads conduct schools for waiters and cooks, but the Illinois Central is believed to be one of the first to fit out a dining car as a self-contained mobile unit, which can be moved anywhere on the system as may be required, to give instructions in the art of cooking and service to those crews whose runs do not bring them into a central point.

This car, which was placed in service last month, is completely equipped as a standard dining car, having the usual kitchen, chill boxes and lockers. A class room has been provided by removing partitions and a section of the lockers in what is ordinarily the pantry.

The car is in charge of L. S. Dotson, traveling chef of the Illinois Central, and under his supervision classes for cooks are conducted every weekday morning at 9:30, after the morning trains have arrived. Each session lasts about an hour and a half. The classes are arranged so that, ordinarily only two crews attend at the same time, each crew consisting of four men—the chef and the second, third and fourth cooks.

The instruction is divided into lectures on the preparation of breakfast, luncheon and dinner. As soon as a cook is rated as having completed his lesson on breakfast satisfactorily, he passes on to luncheon and later to dinner. Under the heading of breakfast, the cooks are

Training Chefs in the Preparation of Foods

instructed as to the best methods of cooking and garnishing meats, fish and vegetables, making coffee and taking care of the urn, cooking cereals, preparing fruit, and the making of hot breads of various sorts. The luncheon and dinner lectures are similar, except that they deal with the preparation of the food applicable to those meals.

In addition to the lectures, actual practice work is done. Breakfasts are prepared and every member of the class is required to share in their preparation. If any of the cooks fail to prepare any of the dishes properly, they are given individual instruction on that particular dish, until they are able to prepare it properly.

Six tables are provided in one end of the car, with lockers containing the usual dining car equipment of linens, silver, china and glassware, and waiters are given instruction and tests there, with the idea of bringing the service to a uniformly good standard. Waiters who display a lack of proficiency in any of their various duties

Waiters Are Also Given Special Training

are also given individual attention so that the fault may be corrected.

Dining car stewards also attend the classes as observers, so that they may properly supervise the work of their crews.

Pennsylvania's Purchases Large

THE total of $164,049,700 was expended by the Pennsylvania for fuel and material during 1926, according to compilations just completed by this road. This total, excluding expenditures in excess of $24,000,000 for new cars and locomotives, amounted to approximately 25 per cent of the company's gross operating revenues. The purchases were made from some 7,500 individuals, firms and corporations, were classified under 75,000 separate items, and represented 520,111 sellers' invoices.

Iron and steel products comprised the largest group total, $57,647,206. Of this amount, $9,533,263 was spent for 216,665 gross tons of steel rails and $9,713,187 for frogs, switches and rail fastenings. Wheels, axles and tires took $4,647,155 and flues and tubes for locomotives $1,603,678.

Fuel purchases aggregated $37,086,879, of which $36,202,878 was spent for 18,306,755 net tons of bituminous coal. Fuel oil amounted to 15,020,219 gal., costing $78,561.

Expenditures for forest products totaled $13,352,981, of which $6,986,168 represented the total purchase price of 4,783,927 cross ties. Timber and lumber totaled $4,151,003.

Miscellaneous items included $7,867,366 for electrical materials, $2,859,447 for lubricating oils and grease, illuminating oils, waste, etc. A total of 1,923,792 cu. yd. of ballast represented a cost of $1,811,843. Air brake material absorbed $2,844,263. The stationery and printing trades received $4,220,665 for the printing of timetables, special notices, etc., as well as stationery required in the conduct of the company's business.

South Manchuria Railway—A Line of Destiny

It seems fated to play a star role in the present crisis in China

By Adachi Kinnosuke

ONE railway line seems to be fated to play a star role in the stupendous drama now unfolding itself over China. It has the total mileage of 694.8. The most significant thing about it at the present time is that it is by far the most potent weapon in the hands of Japan to fight the southern descent of Bolshevism into the heart of continental Asia. It is called the South Manchuria Railway.

A new era in China means a great deal to Nippon. There is another thing, though, that means to her even more than that—that is the Bolshevik conquest of continental Asia. Japan looks upon it with quite as much seriousness and alarm as she did upon the invasion of Czarist Russia into Manchuria in the opening years of this century. And she would fight its coming without a moment's hesitation. Japan is in position—and doubtless will—to throw a formidable force into Manchuria overnight at the first definite sign of it.

Japan on the Guard

Japanese correspondents at Harbin, Manchuria, have been reporting for weeks now Russian forces massing slowly but steadily, along the Siberian frontiers of Manchuria. As these lines are being written, New York papers are carrying the report of the sailing of the 14th Division of the Japanese army for Manchuria. It is going there to replace the 10th Division whose term of service has expired. But the 10th Division is not coming home when the 14th Division reaches Manchuria—at least for some indefinite time. All of which means that for the period of time in question, Japan will have exactly double the armed force she has been maintaining there of late. The total of two divisions, of course, is in no violation of treaty terms under which Japan is permitted to keep her soldiers there. But for some years she has been shaving down her armed force steadily in Manchuria. It is a decidedly expensive affair. And she is not doubling the force today just for the humor of the thing.

The significance of these two facts is about as foggy as the flaming handwriting on the wall. They turn the mere South Manchuria Railway line into a line of international destiny.

To be sure the South Manchuria Railway has been something more than a mere line of steel rails ever since the day it was built by Russia. It was the backbone of the Russian dream of her great Eastern Empire. In September, 1905, the line was turned over to Japan as the result of the Russo-Japanese war and according to the terms of the Portsmouth Treaty. In June, 1906, the South Manchuria Railway Company was established—a semi-governmental corporation — through Imperial Ordinance. It was then capitalized at 200,000,000 yen (1 yen is 49.8 cents); it was far and away the greatest corporation ever established in Japan, and remains to be so today.

The government took over 50 per cent of the capital stock for the property it turned over to the company. The remaining half of its stock was offered for public subscription.

Photo from Adachi

The Wharves at Dairen

Japan, eager for Chinese co-operation and support, invited the government and people of China to subscribe for any portion of the remaining 50 per cent of the stock. The Chinese, however, turned down the offer cold. And not without an excellent reason. They had watched for years, Russia throw millions of her rubles into the enterprise with no sign of getting back much of the capital investment, let alone profit. They were entirely too shrewd to be tempted into any such business. And for that matter, there was no dreamer among the Japanese investors themselves made enough so that they might look upon it as a financially profitable enterprise.

A Fabulous Profit

Yet, when the shares were offered in the Tokyo market, they were over-subscribed and over-subscribed 1,066 times—absolutely a world record. There was not the faintest touch of financial miracle about the whole thing. The investing public of Japan looked upon it in the light of national honor. That was the answer. The success or failure of this venture appealed to them as something which had a deal to do with Japan's standing among the nations of the world. To the utter amazement of everybody, it turned out to be a fabulous mine of profit. Its passenger revenue rose from 3,594,239 yen in 1907 to 14,956,172 in 1926; and its freight business whose total receipts in 1907 amounted to 6,610,274 yen rose in 1926 to 89,080,157 yen. And the year 1926 was by no means an exceptionally prosperous year.

But the railway business of the company does not tell the whole story. It owns and operates a number of coal and iron mines located along its lines. One of them, the famous Fushun coal mine yielded the company and its stockholders more revenue than its transportation business for years; even in 1926, its gross receipts amounted to 68,447,274 yen. Its coal field covers 16,500 acres, extending nearly ten miles, east and west, with the width of about 2½ miles. Its seam is reported to be the thickest in the world and at a point under the town of Chienchinchai it measures 426 feet; its average thickness is about 130 feet. Its total coal store is estimated at more than 1,200,000,000 tons of which 50,000,000 tons have already been mined.

Photo from Adachi

South Manchuria Railway Waiting Room in the Station on the Dairen Wharves

Japan Solving Its Oil Problem

And it is at this coal mine of Fushun that Japan is trying to solve her oil problem. There is no oil well of any importance either in Japan proper or in Chosen. The total output of the few oil wells in the Niigata and Akita Prefectures is not enough to satisfy even one-half the requirement of Japan's navy alone. With the sensational development of aviation, both civil and military, and of internal combustion engines, this lack of oil is nothing short of disastrous to the very peace and existence of the Empire. At the Fushun coal field, there is supposed to be some 5,500,000,000 tons of shale. The company is completing a plant at an enormous cost, capable of handling 700,000 tons of shale a year from which it expects to get about 50,000 tons of heavy oil and 1,000,000 gallons of volatile oil. This, with the assistance of the wells in North Sakhalin, is expected to solve the oil need of the empire amply.

Beside the coal and iron mines, the company has built, owns, and operates a chain of electric light and power companies in Dairen, Changchun, Mukden, Antung, Fushun, Anshan and other cities, the modern sections of which the company has called into existence. It owns and controls a number of other public utilities. It owns 112.5 square miles of land, many of which are valuable city properties including those in Toyko (Japan), Shanghai, Tientsin and Harbin, as well as in all the cities which its railway serves from Dairen to Changchun and to Antung, on the Yalu river.

Although the company increased its capitalization in 1920 to 440,000,000 yen from the original 200,000,000 yen, the amount is far from representing the value of its assets. They are estimated at 1,400,000,000 yen at the lowest calculation.

American Equipment Used

The South Manchuria Railway has a special claim to American interest quite apart from the magnitude of its resources or its political destiny. For it is a 700-mile show window for American achievement in railway materials and equipment—and it runs right across the front porch and entrance hall of continental Asia. It advertises American locomotives, American Pullman sleepers, American passenger and freight cars as nothing else does in the whole of Asia. The line was not built by American engineers. There is no American capital invested in it. Yet on it are running, this very day, more than 300 American-built locomotives and 1,500 cars of American design, many of which were built in American shops by American mechanics. Its famous through expresses are made up of the familiar Pullmans. Along its lines and at Fushun coal mines, visitors can see almost every day, steam shovels, dredges and cranes bearing upon them, some such legend as "South Milwaukee, Wis." More than 89,000 tons of steel rails from the U. S. Steel Corporation plants are upon its roadbed.

Upon all this, of course, hangs a story—a story which throws no little light on the over-worked theme of how the Japanese really feel toward America and the Americans.

At the time when Japan wished to buy a great deal of rails and rolling stock to reconstruct and equip the line, Japan did not have the ready cash to pay for them. Wall street did not have much money to finance a foreign enterprise of that sort in those days. So Japan went to the London market. There she borrowed the sum of 12,000,000 pounds sterling in two loans of six million pounds sterling each. Did Japan spend the loans for

British rails and on British equipments? She did not! Japan came to the United States and spent no less than two-thirds of the loan in the American market for American materials. In the financial year of 1907, it spent 18,917,580 yen for American goods which was 67 per cent of the total expenditure of the company in that year.

The result is curious. Back home in Japan, the Japanese worry along with their shabby, toy-like, old-fashioned coaches on their narrow-gage railway. But out there in Manchuria, they have built a great line fashioned after the generous American model—of the standard gage of 4 ft. 8½ in. with the entire service copied from the American practice on her great trans-continental lines.

A First Line of Defense

All this, of course, did not come from a flaming pro-American sentiment in Japan. And this construction of a great line of transportation on the most expensive American line was no hasty measure on the part of Japan. On the contrary, it was the result of a long, careful consideration. Japan invested the amount of money (tremendous in the light of her financial ability) and devoted some of her ablest men for the construction of the South Manchuria line for many reasons. But one of them overshadows the rest. Namely, that this Manchurian line is the first line of defense for the Empire. Without that line, she will be unable to meet any first-class hostile power coming down upon her out of the Asian continent. It was built generously for the reason that in time of need, it is expected to function instantly, efficiently and smoothly with the least possible chance of a break-down—and under the severest war-time stress. The adoption of American standards and American materials in the building of the line, therefore, was about the highest compliment Japan could possibly pay the American genius in railway construction.

Extent of the System

The railway system owned and operated by the company is composed of a trunk-line running from Dairen (the Dalny of the old Russian memory) to Changchun, where it connects with the Chinese Eastern Railway and through it with the trans-Siberian main line which runs to Moscow. The Dairen-Changchun line therefore forms a part of a world highway connecting Asia with Europe. This trunk line is 438.5 miles long, and runs through the southern end of the rich central plains of Manchuria. When the Russians built it, it had 65-pound rails. The Japanese replaced them with 100-pound rails and double-tracked it to Kaiyuan—and the double-tracking of the entire distance to Changchun is to be completed very soon. It is on this line the company maintains the express service with trains which remind the traveler of the "Broadway Limited." They are equipped with observation cars, diners, Pullman sleepers and precisely with the same high quality of service as on great trans-continental expresses in the United States. And they make the run of 438 miles in 12½ hours.

Branching away from Mukden, the ancient capital City of the Manchu Dynasty, and running east over the Changpai Range to Chosen is another line of 161.7 miles, owned and operated by the company. This reaches the Yalu river which divides Manchuria from Chosen, at the city of Antung, and there it connects with the government railway of Chosen and forms with it the highway direct from Japan across the Korean Strait to Europe. This Antung-Mukden line was originally built by the army of Kuroki in the days of the Russo-Japanese war, as it made its historic march into the Battle of Mukden. The whole line was reconstructed by the South Manchuria Railway later as a permanent line. It was built with as much care and with as excellent materials and equipments as the trunk-line between Dairen and Changchun.

Japan has therefore two main lines of railway to throw her army into the heart of Manchuria in time of war—one across the Korean Strait over the Chosen government railway and over the Mukden-Antung line of the South Manchuria Company; and the other by sea to the port of Dairen at the tip end of the South Manchuria and thence to the north over the main trunk line between Dairen and Changchun.

The S. M. R. owns and operates four short branch lines beside the two main lines mentioned above: Port Arthur-Dairen line, Yinkou branch, Yentai colliery branch and Hunho-Fushun line, with a total mileage of 94.6.

The company has extended the mileage of its railway but by a few miles in the 20 years of its activity. The treaty limitations does not permit the extension. But the S. M. R. has done much in helping the Chinese themselves to build railways in Manchuria. It furnished loans and in some cases it did the actual work of construction. All of these have proved unprofitable from purely financial point of view. The most important of these is the Ssupinkai-Taonan line of 264.5 miles, including Paiantala branch. Another is the 141.7 mile line between Taonan and Tsitsihar. Both of these lines are owned and operated by the Chinese and a few Japanese in their employ hold minor positions whose duties are entirely supervisory. Then there is another line, of 79.3 miles connecting the city of Kirin with the northern terminus of the trunk-line of the S. M. R., Changchun. This line is under the management of the South Manchuria Company under special contract with its Chinese owners. And an additional line, which is really the eastward extension of this line from Kirin to Tunhua, is now being built by the S. M. R. for a Chinese interest.

While the loan transactions of the S. M. R. with the Chinese builders of railways in Manchuria have not turned out profitably, all these new lines under the ownership and management of the Chinese have proved beneficial to the freight business of the company. They are serving the S. M. R. more and more with the opening of virgin fields in Inner Mongolia and northern Manchuria as feeders of freight business to its main line.

One can get a fair idea of the magnitude of the S. M. R. from the following figures: Last year its employees totaled 51,648, of whom 29,326 were Chinese. The Chinese day laborers employed numbered about 13,000 men. Its equipment today consists of 425 locomotives, 430 passenger cars and 6,642 freight cars. The stations along the line number 128 in all. In the early days of Japanese management, the line had to import practically all its equipment. Now it has two splendidly fitted shops in which it is building most of its equipment. One of them at Shakakou near the port city of Dairen covers 9,972,000 square feet. There practically everything the railroad needs, except rails, from locomotives to repair parts are manufactured today. This shop alone has the capacity of repairing simultaneously 27 locomotives and 36 passenger cars and 130 freight cars.

A Creator of Cities

But it is after all, as the creator and administrator of new cities and towns along its lines that the S. M. R. makes its lasting impression on the life of Manchuria and of the East generally. It has been the creator of cities in a much more direct sense than the Union Pacific or the Great Northern Railway systems in United States have played the rôle of the "empire builder." For the S. M. R.

is entrusted, by its very charter, with the work of building and administering towns and cities. For years—every year since its organization in fact—its budget has always carried an item of some 10,000,000 yen for local administration expenditure. That amount is practically charged off as total loss. While some of the investments under this head proved financially profitable, the essential idea back of the annual appropriation is that of non-commercial public service. Building hospitals, schools, streets, free libraries and dispensaries and other establishments for public health of the peoples are the main items of expenditure.

At Dairen

The great port city of Dairen is at once the monument and the high water-mark of the S. M. R.'s achievement. It stands also as the measure of Japan's ability as the builder of modern cities. As I approached it from the sea a few years ago, its general appearance was precisely that of a great American or European port. Its 2½ miles of cement piers were crowded with ships of all flags. Later I spent days wandering all over its paved streets between solid ranks of modern occidental buildings of brick and stone. Japan has nothing approaching it on her home islands. In point of port facilities, paved streets, modern office and residential structures, telephone service, electric tramways, school facilities, water-supply and hygienic establishments, Dairen can hold her own with Kobe or Shanghai without a blush—excells them in many respects. And Kobe today stands at the head of all Japanese ports in modern construction and equipments.

Development of City

At the time when Russia turned over Dairen to Japan, it was nothing much more than a cluster of houses about the present street called Russia-Machi. South of the tracks where most of the present city stands, there was nothing but rough ground broken here and there with ponds and hills. The site of the present wharf office building—one of the largest structures in the city—was then under water. In the Russian days, Dairen had the population of 18,000. In November, 1926, there were no less than 201,774 people in it, of whom 123,146 were Chinese. At the time the port of Dairen was turned over into the hands of Japan there were only two wharves completed. The harbor had the depth of 17 to 28 ft.; at the main wharf basin, it was 18 ft. Today, the depth of the main basin averages more than 29 ft.—deep enough to berth vessels of more than 30,000 tons. The wharf and quay berthing wall measures 4,330 meters in length and can accommodate at one time 29 ships of the total tonnage of more than 220,000 tons. In the first year under the Japanese control, in 1907, 1,143 vessels made port at Dairen. Last year, the number was 3,746. The tonnage loaded on and discharged from them amounted to 919,952 tons in 1907 and in the year of 1926, to 6,830,059 tons.

The foreign editor of "Le Matin" of Paris was there in the latter part of March of this year. And this is what he wrote of it: "I visited Dairen and its environs. When I am told that Japan has invested nearly 3,000,000,000 yen (about $1,500,000,000) I can readily believe it. The magnificent network of railroads, coal mines in full activity, hundreds of mills for the production of vegetable oils and excellent roads all prove the results of twenty-two years of Japanese efforts."

Bolsheviks Cannot Pass

Is Russian Bolshevism going to make something more than a mere verbal big-push to plant the seeds of world revolution in the ancient land of the children of Han? Then, this South Manchuria Railway line is about the only way the Russians could make their southward way on any large scale. For the caravan trail from Kiakhta through Urga down to Kalgan is utterly unfit for the movement of a great army. In this light, the bare fact that this S. M. R. line happens to be the most powerful weapon in the hands of the only power in the whole of Asia able to stage a fight that should sober even the drunken on-rush of Bolsheviks, takes on something of a dramatic color.

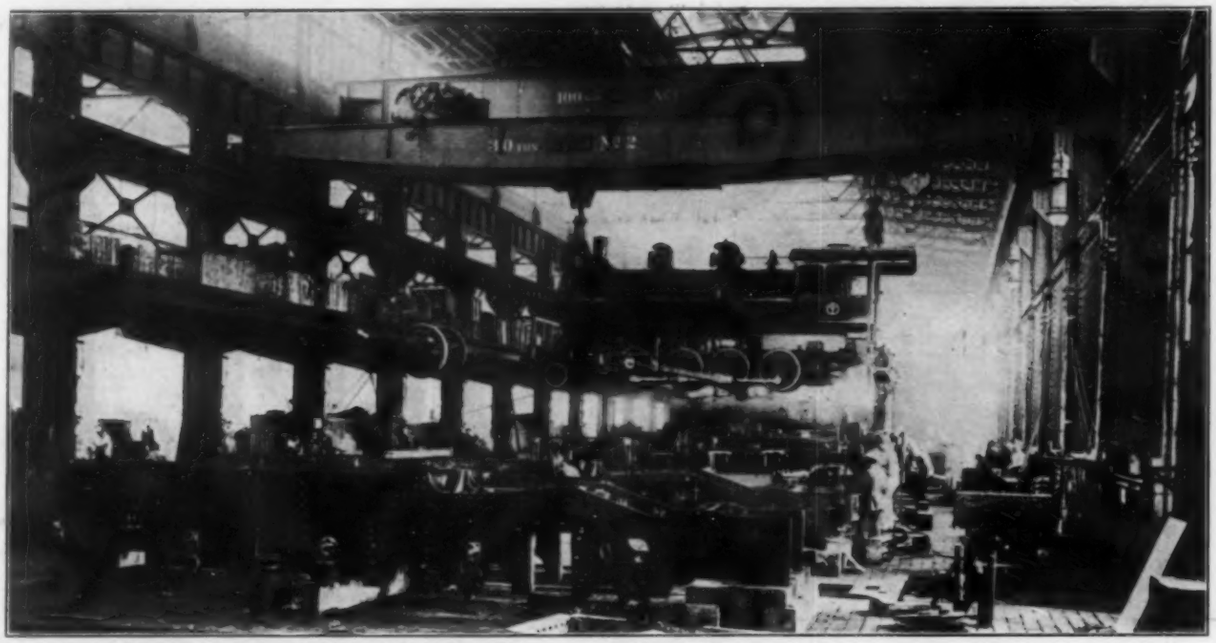


Photo from Adachi

Locomotive Shop of the South Manchuria Railway near Dairen

Journal Friction in Relation to Train Operation

Influence of roller bearings on acceleration at high speeds—
Their effect on brake action

By H. E. Brunner* and J. S. Tawresey**

WITH the acceptance of the roller journal bearing as an important consideration in any program of modern passenger car equipment, it is interesting to establish some basis for estimating possible results in train operation owing to reduced journal friction. The factors of acceleration and limiting speed, unlike the manifest qualities of reduced starting friction, reliability and endurance, cannot be directly inferred from previous tests. The extensive experience already acquired in the operation of roller bearing passenger equipment has demonstrated the practical utility of this device without, however, fully defining the operating results that may be anticipated.

Operation of a train is fundamentally a problem in

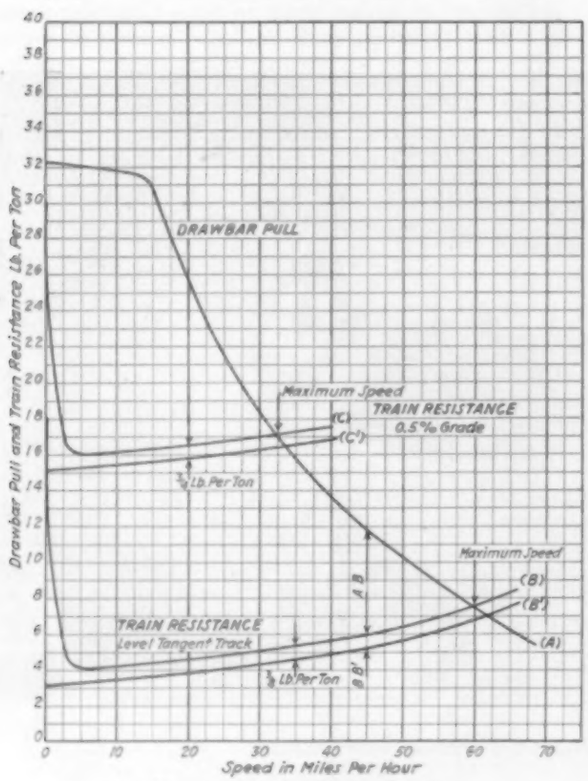


Fig. 1—Tractive Force Curve

applied dynamics. The motive power unit must develop a tractive force which serves to balance the several component forces of train resistance, and imparts to the train, as a whole, a speed which is consistent with the operating schedule. Theoretical studies utilizing a basis of empirical data drawn from extensive tests have shown that it is possible to predetermine locomotive and train performance approximately. The same method appeals as being available for investigation of possible results through a reduction in journal friction.

The purpose here is to picture correctly the part played by journal friction as a component of the complex system of forces involved in acceleration of a train by a steam locomotive. The reduction effected in journal friction by the use of roller bearings must be considered relatively

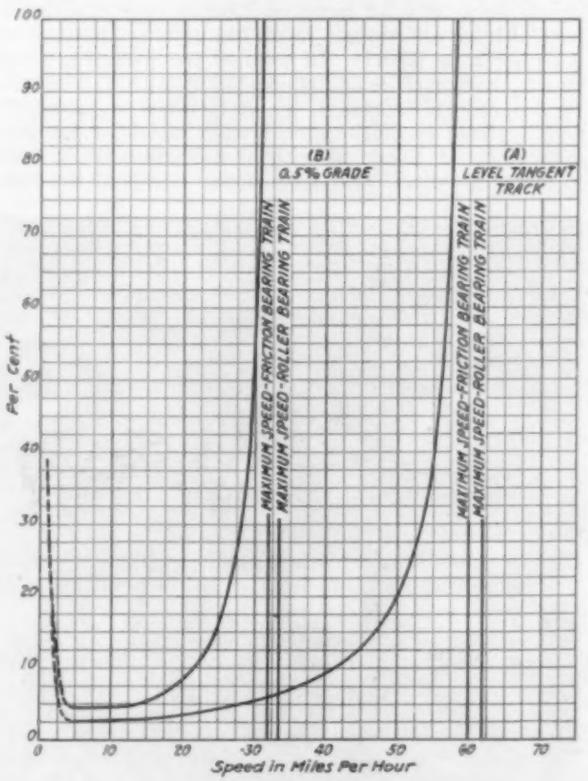


Fig. 2—Increase in the Rate of Acceleration

to the total train resistance and to the available drawbar pull from the locomotive. Since each of these factors vary with speed, their proportionate relation must be considered throughout the range from starting to maximum speed.

Reduction of Total Train Resistance by Roller Bearings

Under normal average conditions it may be estimated that S. K. F. journal bearings will reduce the total train resistance, expressed in pounds per ton, to a value from one-half to one pound per ton under that obtaining with standard A. R. A. friction bearings. An average value of ¾ lb. per ton may be assumed for rough estimates.

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The variation is due primarily to conditions, such as load, speed and temperature, which directly affect the friction of the plain bearing.

To visualize the effect of a reduction in train resistance of a magnitude approximating ¾ lb. per ton, a typical example is considered under conditions taken from an actual train in through service. Curve *A*, Fig. 1, represents the pull-speed curve of the locomotive and shows the falling off of drawbar pull, with increase in speed; the values shown being in pounds per ton of train weight. Train resistance with friction bearings, on level tangent track, is shown by curve *B*, and this indicates a maximum attainable speed of 60 m.p.h. At this speed the drawbar

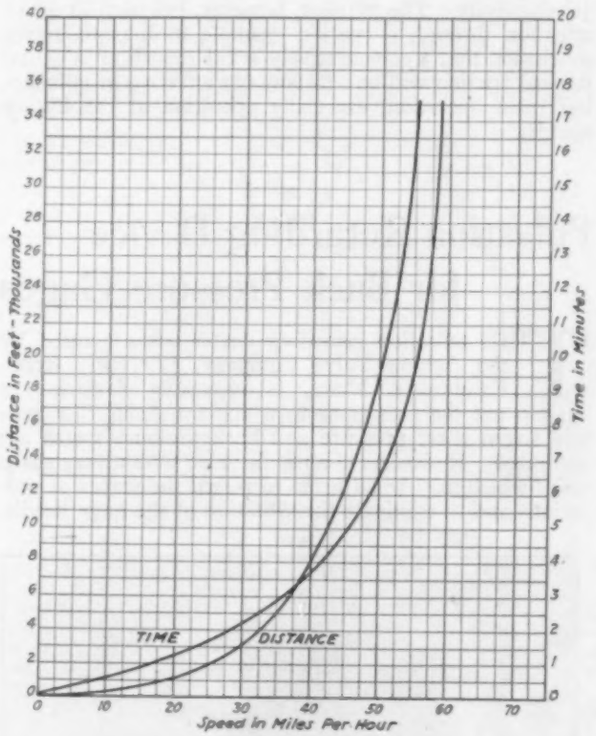


Fig. 3—Speed-Time and Speed-Distance Curves for Acceleration—Data from Friction Bearing Curve *B*, Fig. 1

pull of the engine is equal to the train resistance. Curve *B* shows values of train resistance ¾ lb. per ton less than those of *B* and without the high starting values up to speeds of five miles per hour. This may be taken as representative of train resistance with roller bearings on equipment and under conditions directly comparable with those shown in curve *B* for friction bearings. In this case the maximum speed is approximately 62 m.p.h.

Important Influence of Journal Friction

The force available for accelerating the train at any given speed is the excess of drawbar pull over train resistance. Thus, in Fig. 1 at 45 m.p.h. the drawbar pull is 12 lb. per ton and the corresponding train resistance is 6 lb. per ton, leaving 6 lb. per ton available for acceleration on level tangent track. The rate of acceleration at this speed will be proportional to the force of 6 lb. per ton. If the train resistance be decreased by an amount BB', Fig. 1, the rate of acceleration will be increased in the ratio of $\frac{BB'}{AB}$, or approximately $\frac{0.75}{6.00} = 12.5\%$. It is at once apparent that a comparatively small difference in train resistance becomes increasingly important in influencing acceleration at higher speeds, where the margin of excess drawbar pull becomes relatively small. Curve *A* in Fig. 2 shows the per cent increase in the rate of acceleration due to a decrease in train resistance from *B* to *B'* of Fig. 1. The rate of acceleration is double (100 per cent increase) at a speed of 58 m.p.h.

With a higher train resistance such as that due to grade or curvature, the margin of excess drawbar pull is decreased. In this case the maximum attainable speed is lower (see curve *C*, Fig. 1) and the assumed saving in train resistance becomes important in its effect on acceleration at correspondingly lower speeds. Curves *C* and *C'*, Fig. 1, show train resistance on a 0.5 per cent grade, taking account of engine and tender weight, so as to be comparable with the drawbar pull curve *A*. In Fig. 2, curve *B* shows the percentage increase in the rate of acceleration due to a decrease of 0.75 lb. per ton in train resistance, on a 0.5 per cent grade as shown in *C* and *C'*, Fig. 1. The increase is 100 per cent at a speed of 31 m.p.h.

Referring to Fig. 1, the speed-time and speed-distance curves have been worked out for the friction bearing train. These curves are shown in Fig. 3, from which it is apparent that the large saving in starting effort, due to roller bearings, while assuring extremely easy starting, is not effective in reducing appreciably the period of acceleration. The friction bearing train attains a speed of 5 m.p.h. in about 100 ft., in less than ½ min., which, in total, comprises a negligible percentage of the distance and time involved in attaining operating speeds. A speed of 40 m.p.h. is attained in a distance of 8,000 ft., and in approximately 3¾ min. which represents 16 per cent of the distance and 28 per cent of the time required to reach a speed of 57.5 m.p.h. From curve *A* Fig. 2, it is seen that the increased rate of acceleration for the roller bearing train amounts to 10 per cent at 40 m.p.h. and rises rapidly to 80 per cent at 57.5 m.p.h. with a maximum attainable speed of 62 m.p.h. It is thus evident that by far the major part of both the distance and time involved in acceleration is under conditions in which a small saving in train resistance is able to effect a marked increase in the rate of acceleration. A similar condition is discerned in the case of added resistance due to grades and curvature (*C* and *C'*, Fig. 1, and *B*, Fig. 2) when the maximum or balancing speed is approached.

In connection with train operation, it is misleading to consider the problem entirely from the point of view of acceleration following a train stop. In maintaining a scheduled speed over a varying road profile and alinement, ability to accelerate at higher speeds, say above 40 m.p.h., is important in its cumulative effect. The saving in time possible under such conditions may prove to be the deciding factor in the operation of existing motive power for an increasing burden of traffic. This is an important possibility in roller bearing equipment that is not directly obvious or apparent.

Relation of Journal Friction to Braking Power

The question is frequently proposed as to why roller bearings can materially improve the accelerating characteristics of a train without involving a corresponding sacrifice in braking power when bringing the train to a stop. In this case it is again necessary to consider journal friction in its proportionate relation to other forces acting on the train. In stopping a train from a speed of 60 m.p.h. in a distance of 2,500 ft., the retarding braking effort corresponds to an average resistance of about 100 lb. per ton of train weight. With roller journal bearings reducing the active train resistance by ¾ lb. per ton the effective braking force will be decreased by three-quarters

of one per cent. In an emergency stop of 1,250 ft., the corresponding braking effort is about 200 lb. per ton and the loss in braking power but three-eighths of one per cent. Fig. 4 illustrates the conditions obtaining in a 2,500 ft. stop, and it is obvious that no appreciable sacrifice is made in braking power even with comparatively lighter brake applications.

When a train is drifting under the action of its own momentum only, the force acting to retard its speed is

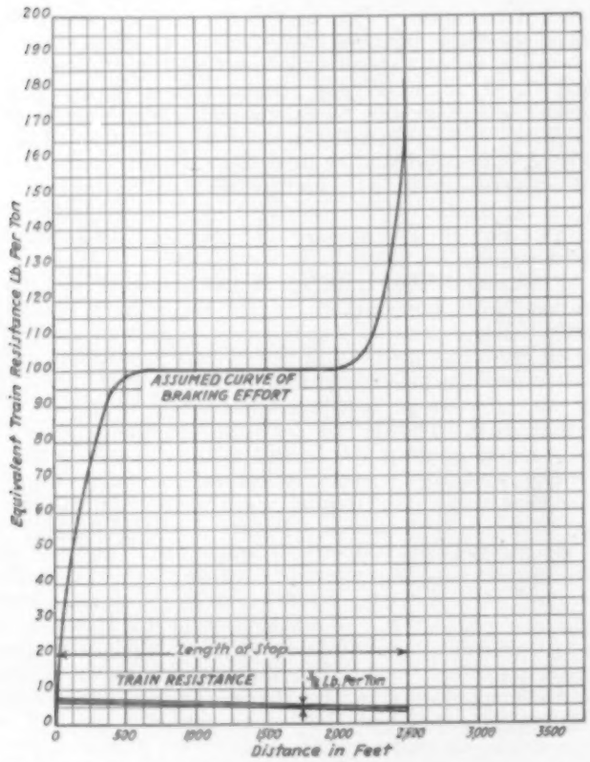


Fig. 4—Relation of Braking Force to Train Resistance in a 2,500-ft. Stop from 60 m.p.h.

simply the net train resistance. At a speed of 45 m.p.h. this may be approximately 6 lb. per ton and a decrease in journal friction of ¾ lb. per ton represents a decrease in rate of retardation of about 12½ per cent. At lower speeds, the same saving in journal friction is a greater percentage of the total resistance and a roller bearing train will coast a greater distance and maintain a higher speed over the same distance, than corresponding equipment with friction bearings. This suggests the necessity of different handling of the brakes in operating a roller bearing train on a given schedule, in order that the brake application be made at a point to correspond with the higher speed and greater momentum in approaching the stop.

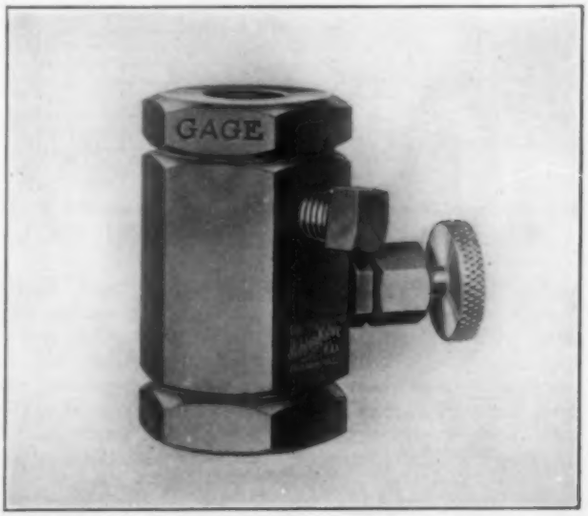
Difference In Resistance

For the purpose of this discussion the difference in train resistance between friction bearings and roller bearings has been approximated at ¾ lb. per ton. There is good evidence of a general character to indicate, that under normal average conditions, this difference may vary between ½ lb. per ton and 1 lb. per ton. The plain bearing is subject to considerable variation in friction with all influences that affect the character and persistency of the oil film between the journal and bearing. These include unit load, speed and oil viscosity. Low temperature in the oil film increases the friction in a plain bearing and high temperature decreases the friction up to the point where the oil film ruptures and the bearing seizes. Since the temperature of the plain bearing depends on both weather conditions and operating schedule in terms of speed and number and duration of stops, the actual friction is subject to considerable variation. On the other hand, the efficiency of a roller bearing is broadly independent of speed and temperature conditions, and it is not subject to those adventitious circumstances that constitute a hazard to the operation of a plain bearing.

Local circumstances and characteristics of equipment and service will modify the detail of this discussion quantitatively. The purpose, however, has been to direct attention through a specific example to the qualitative conclusion that a comparatively small reduction in actual journal friction will be substantially effective in influencing train operation, especially operation at the higher speeds.

Pulsation Retarding Device for Back Pressure Gages

THE pulsation retarding device manufactured by the Ashton Valve Company, 179 First street, Cambridge, Mass., is especially designed to smooth out the pulsations to which the Ashton locomotive steam chest pressure and back pressure gages are subjected. It consists of a needle valve with a very sharp point which may be adjusted to retard the waves of pulsations and to eliminate the vibration of the gage needle.



The Ashton Pulsation Retard Device for Use with Back Pressure Gages

There is a blow-out passage through the body and across the seat of the needle valve and by removing the ⅛-in. pipe plug, it is possible to blow out any sediment that may have lodged on the seat or in the passage.

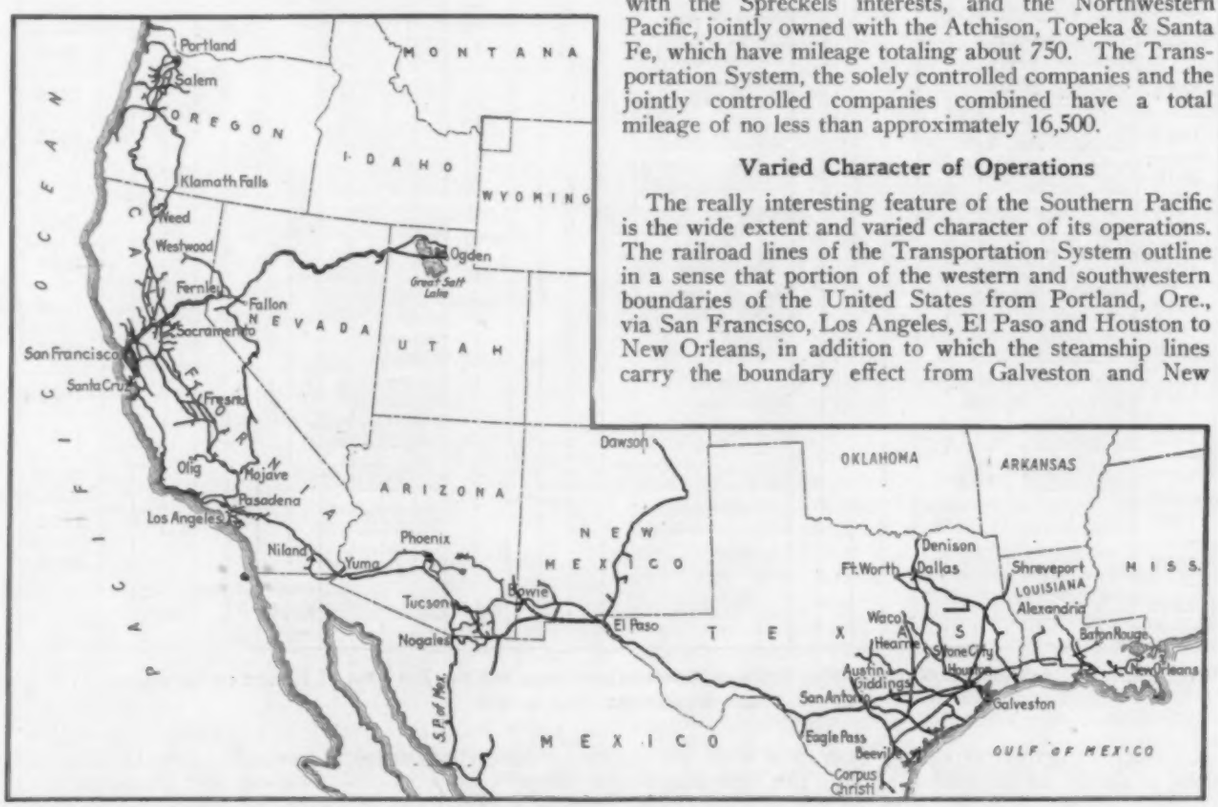
The device is made for ¼-in. standard pipe thread connections and should be installed in the pipe lines below the usual steam gage syphons, which prevents the condensation in the syphons from being blown out and live steam allowed to enter the gage tubes.

Southern Pacific Expands

In 1926 *earned* $11.29 *a share on stock with return on book value of only* 3.98 *per cent—Extensive improvement program*

THERE are, in this country, ten billion-dollar corporations. Five of these are railroads. Of the five railroad companies, the one having the largest total assets and the greatest value of physical properties is the Southern Pacific and it ranks second in the entire group of ten companies. At the end of 1926 the total assets shown in the parent company's balance sheet amounted to $2,184,000,000, as compared with the Steel Corporation's $2,446,000,000.

In an editorial in the *Railway Age* of April 2, it was pointed out with reference to the country's ten billion-dollar corporations that while the railroads had half the number and owned 52 per cent of the total assets, they earned only 27 per cent of the net profits and paid only 34 per cent of the dividends, whereas at the same time they had issued 78 per cent of the funded debt. While the Southern Pacific ranks second in the group of ten from the standpoint of total assets and the total value of the physical properties, it would rank, on the basis of the more recent figures made available since the editorial appeared, tenth from the standpoint of net profit and ninth from the standpoint of dividends paid, no figures for the latter being given by the Ford Motor Company. At the same time, it led all others in funded debt outstanding.



The Southern Pacific Lines

Extent of System

The Southern Pacific's enormous investment in road and equipment of 1.4 billion dollars, is spread over approximately 13,500 miles of railroad, 24 miles of ferry lines and 3,800 miles of water lines. These include what is technically described as the Southern Pacific Company and Transportation System Companies. In addition, however, there are also the so-called solely controlled affiliated companies which include notably the Pacific Electric and the Southern Pacific of Mexico. The several companies in this group operate about 2,500 miles of railroad and have assets totaling one-quarter million. There is also a group of jointly controlled affiliated companies, including the San Diego & Arizona, jointly owned with the Spreckels interests, and the Northwestern Pacific, jointly owned with the Atchison, Topeka & Santa Fe, which have mileage totaling about 750. The Transportation System, the solely controlled companies and the jointly controlled companies combined have a total mileage of no less than approximately 16,500.

Varied Character of Operations

The really interesting feature of the Southern Pacific is the wide extent and varied character of its operations. The railroad lines of the Transportation System outline in a sense that portion of the western and southwestern boundaries of the United States from Portland, Ore., via San Francisco, Los Angeles, El Paso and Houston to New Orleans, in addition to which the steamship lines carry the boundary effect from Galveston and New Orleans, around almost the rest of the border of the country to New York. There are networks of lines in eastern Oregon, throughout California, in southern Arizona, southwestern New Mexico and in eastern Texas. Lines of the Southern Pacific form parts of no less than three transcontinental routes. One of these is the double-track Central Pacific from San Francisco to Ogden, the western part of the Overland route. Another is the line to New Orleans—the Sunset route—and the third is the line of the El Paso & Southwestern via

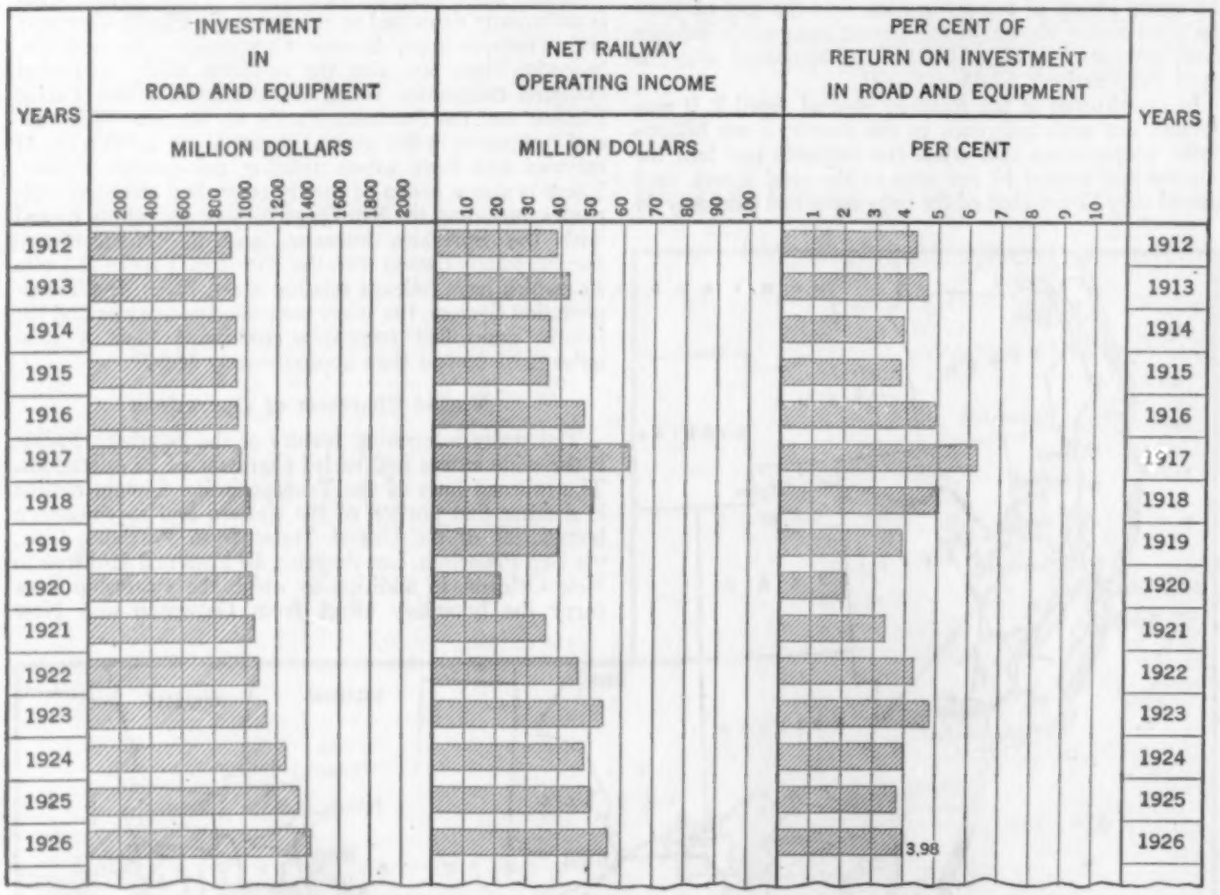
Tucumcari, N. Mex., and the Rock Island, the route of the Golden State Limited.

In its wide-flung territory, the Southern Pacific is required to maintain operations in almost every conceivable variety of climate which this country affords. Its engineers maintain the largest mileage of snow sheds owned by any railroad company. At other places the lines cross deserts where the problem is not drifting snow but shifting sand. One main line of the Southern Pacific reaches a point—in the Salton Sink—that is below sea level. Another line crosses the Sierras at a height of 8,000 ft. above the sea. The problems of operation include the maintenance of service on mountain grades, over treeless flat deserts, and across marshes. At San Francisco and Oakland the road maintains one of the most extensive suburban services in the United States; in other places there is almost no population at all. The new lines in southern Oregon serve virgin timber country. In Texas, Southern Pacific lines serve the oil fields with their peculiar problems of operation. In California, the road serves the citrus fruit areas and the Imperial Valley which has come to be the country's largest producer of canteloupes either of which require the most expedited service and a perfect car supply.

But wherever one travels on Southern Pacific rails he will find a railroad built and operated to the highest standards, courteous service and apparently an extremely well-satisfied attitude on the part of the shipper and the public. No one can study Southern Pacific without being impressed regarding its future possibilities as the enormous territory that it serves becomes more developed.

Rate of Return on Investment

The Southern Pacific did not do particularly well in 1926. The net income after interest and other charges of the Transportation System totaled $38,791,374 and in addition there was received $3,243,291 from the affiliated companies. The two amounted to $42,034,665 which was equivalent to $11.29 a share on the company's outstanding capital stock. In 1925 the total net income was $37,916,317, or $10.18 a share. This improvement in 1926 as compared with 1925 does not look bad, but in 1923 the company earned $44,552,482, or $12.94 a share, and in 1917 with a smaller system, smaller traffic and a much smaller investment it earned $49,129,417, or $17.65 a share.



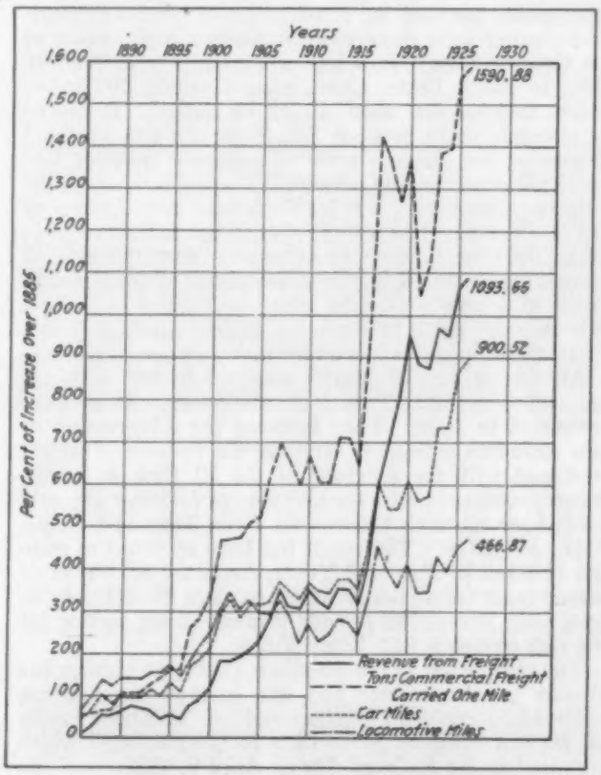
Investment in Road and Equipment, Net Railway Operating Income, and the Per Cent of Return on Investment in Road and Equipment, 1912 to 1926

The same picture is presented when one uses the figure of net operating income of $55,796,718 which compared with $50,313,759 in 1925, an increase of 10.90 per cent. In 1923, however, before the acquisition of the prosperous El Paso & Southwestern, net railway operating income totaled $54,228,023. In 1917, the net operating income was about 62 million. This introduces the most important fact that is to be found in the Southern Pacific annual reports, namely, the small return on the investment. The following figures showing the relationship of net railway operating income to the book value of road and equipment of the lines constituting the Transportation System will be of interest in this connection:

Year	Per cent	Year	Per cent
1921	3.36	1924	3.99
1922	4.29	1925	3.77
1923	4.81	1926	3.98

Six-year average—4.03.

Most roads have since 1921 shown a progressive improvement with respect to the per cent earnings on their investment. It will be seen that this is not the case with the Southern Pacific. Its 1926 rate of return was less than in three other years since the termination of federal



Freight Service and Traffic

Showing by years to December 31, 1926, the per cent of increase over the calendar year 1885, in commercial freight revenue (excluding water lines and water transfers), in the number of tons of commercial freight carried one mile, and in the number of miles run by cars and by locomotives in freight-train service—Locomotive miles include all locomotive miles run with freight trains, and three-fourths of the locomotive miles run with mixed trains.

control and less than the average for the six years which have now elapsed. If the record is carried back further it appears even less satisfactory. In the 15 years since 1912 there have been only five in which the per cent of return on investment in road and equipment was less than in 1926.

These figures do not include the so-called solely affiliated companies. Their net operating income in 1926 equalled only 2.3 per cent of their property investment. This was, of course, due largely to the Southern Pacific of Mexico, into which the parent company has now poured large sums of money but from which thus far it has had no return. Particularly is this an example of the way in which the Southern Pacific is building for the future.

The Southern Pacific stockholder will be seen to have a wide margin of protection in that with a rate of return of only about 4 per cent for the Transportation System and of only 2.3 per cent for the solely affiliated lines, net earnings in 1926 were sufficient to yield $11.29 a share of stock outstanding. The Southern Pacific's balance sheet as of December 31, 1926, showed total investments of $2,078,513,321, including the investment in road and equipment, the investments in affiliated companies and other investments. In addition, it showed additional current assets of $84,613,794 of which about 25 million was cash and 42½ million materials and supplies. As against these assets, there is outstanding $770,410,806 of stock and $737,287,629 of bonds, but a large portion of these securities are held within the system making the amounts actually in the hands of the public very much less. Details are given as follows:

	Capital stock	Long term debt
Southern Pacific Company	$372,380,906	$216,431,885
Transportation System Companies	398,029,900	520,885,744
Total	$770,410,806	$737,287,629
Held by the public	372,406,316	599,267,988
Held within the System	398,004,490	138,019,640

It will be noted that only a few shares of the stock of the Transportation System Companies are held by the public and that the stocks and bonds in the hands of the public combined total less than $1,000,000,000. As against the investment in road and equipment of $1,400,000,000, this gives a margin of $400,000,000. As of December 31, 1926, the company reported also a total corporate surplus of $433,994,056. The Southern Pacific stockholder, therefore, appears to be in a rather satisfactory position from an investment standpoint even though he might wish for a larger return on his money. Southern Pacific stock is now paying 6 per cent dividends which rate dates back without change to October, 1907. The initial dividend on this issue was paid one year before that. At the present time the stock is selling at about 112. Dividend payments in 1926 totaled $22,343,004.

The return of the Transportation System of 3.98 per cent in 1926 is the more regrettable because in that year the system had the largest total operating revenues in its history. These totaled $298,800,998 and were $3,699,244 or 1.25 per cent better than the record made in the previous year. The increase in gross income developed as a result of an increase of 0.4 per cent in the revenue ton-miles over 1925, which was the previous record, and from a larger percentage of high class freight effecting an increase in the revenue per ton per mile of 0.015 cents, or 1.08 per cent. The freight revenues of the Pacific lines showed an increase over 1925 of about 4 million due chiefly to the heavy traffic of the first seven months but on the Texas and Louisiana lines there was a decrease of about a million. The reason was a drought in 1925 which

Southern Pacific Operating Results, Selected Items, 1916 to 1926

Year	Average mileage operated	Revenue ton miles	Revenue passenger miles	Rev. per ton mile, cents	Total operating revenues	Total operating expenses	Net operating revenues	Operating ratio	Net railway operating income	Net after charges	Net increase in investment in road and equipment
1916..	11,101	10,779,071,000	1,643,270,000	0.959	163,427,423	103,088,737	60,338,687	63.08	47,000,000	35,422,514	.....
1917..	11,137	13,419,091,000	2,024,391,000	0.923	193,971,490	120,601,823	73,369,667	62.18	62,000,000	49,129,417	30,197,564
1918..	11,102	12,765,384,000	2,217,532,000	1.113	221,611,206	162,722,372	58,888,834	73.43	51,000,000	28,684,916	14,713,564
1919..	11,043	11,933,299,000	2,379,026,000	1.286	239,657,272	188,385,172	51,272,100	78.61	39,677,068	31,548,607	10,726,144
1920..	11,151	12,951,778,000	2,407,400,000	1.364	282,269,504	242,113,790	40,155,714	85.77	21,312,344	32,070,275	15,661,012
1921..	11,188	10,079,305,000	1,823,478,000	1.704	269,494,365	212,572,263	56,922,103	78.88	35,946,791	30,618,778	32,800,834
1922..	11,224	10,837,265,000	1,812,335,000	1.563	262,519,170	193,664,456	68,854,713	73.77	46,222,846	32,600,150	8,984,749
1923..	11,232	13,000,879,000	1,946,416,000	1.437	287,204,635	207,166,588	80,038,047	72.13	54,228,023	44,552,482	51,471,243
1924..	11,476	13,132,847,000	1,841,391,000	1.397	275,904,111	203,051,329	72,852,782	73.59	48,101,416	35,754,416	141,868,180
1925..	12,950	14,581,435,000	1,858,622,000	1.382	293,074,553	215,609,318	77,465,235	73.57	50,313,759	37,916,317	83,033,192
1926..	13,280	14,724,693,000	1,837,935,000	1.401	298,800,998	215,595,480	83,205,518	72.15	55,796,718	42,034,665	58,788,356

Standard return for operations during federal control, $48,167,343.

incidentally had decreased 1925 revenues about 3.5 million below those of 1924.

The record-breaking 6,000,000-bale Texas cotton crop was also a factor in the 1926 decrease because of the decline in the price and purchasing power of cotton. There was also a large decrease in the volume of petroleum attributed to pipe line competition and a decline in the production of fields tributary to Southern Pacific rails. The record shows that the lines in Texas and Louisiana moved 8.4 per cent less ton-miles in 1926 than in 1925. The decrease totaled 344 million ton-miles but the increase on the Pacific Lines was such that the ton-miles for the system increased 58 million or as above noted 0.4 per cent.

As against the increase of $3,699,244, or 1.25 per cent in total operating revenues, the operating expenses were reduced $2,166,089 or 0.99 per cent. The expenses for maintenance increased but there was a substantial decrease in the transportation expenses.

The increase in the case of maintenance of way expenses was $1,785,482 or 4.39 per cent. This is explained by the fact that in 1926 the company laid 510 track miles of new rail as compared with 349 miles in 1925, 403 miles in 1924 or 458 in 1923. It put in more ties and tie plates than in any previous year back, at least, to 1922.

Maintenance of equipment expenses increased $857,452 least, to 1922.

The transportation expenses decreased $5,714,769 or 5.30 per cent which interesting result, with the increase in traffic, was explained as being due chiefly to lower prices of fuel and a reduction of 3.53 per cent in the pounds of fuel per 1,000 gross ton-miles. The company reported for 1926 a consumption of 128 lb. of coal or its equivalent per 1,000 gross ton-miles on the Pacific Lines and only 113 on the Texas and Louisiana Lines. The average for the western district in 1926 was 133.

Comparison With Other Roads

How do the Southern Pacific's ratios of operation compare with those of other roads in its territory? There follow figures for that company, those of its neighbors, the Union Pacific and the Santa Fe, and those for the western district as a whole, in addition to which there are also shown the relationships that the net railway operating income of each of these bears to total railway operating revenues.

Per Cent of Total Operating Revenues, 1926

	Southern Pacific	Union Pacific	Atchison, Topeka & Santa Fe	Western District
Maintenance of way	14.2	13.7	13.4	14.3
Maintenance of equipment	17.0	18.5	18.3	18.7
Transportation	34.2	23.6	29.7	33.5
Total expenses (operating ratio)	72.2	68.5	65.2	71.97
Ratio of net railway operating income to total operating revenues	18.7	20.5	25.5	19.4

It will be observed that from the standpoint of the proportion of gross revenues translated into net operating income the Southern Pacific seems out of line. The contrast of its figure of 18.7 with the Santa Fe's 25.5 is especially striking and it will be noted that the 18.7 is also below the average of 19.5 for the western district. The Southern Pacific's operating ratio in 1926 was only slightly more than that for the western district but by no means as good as that of the Union Pacific or Santa Fe. The difficulty seems to lie in the transportation ratio. Operating officers on many eastern roads will envy the Southern Pacific's transportation ratio of 34.2 but it will be seen that it is not as good as the figure for the western district and much less satisfactory than that of the Union Pacific or the Santa Fe.

Development Plans

On the other side of the picture is the Southern Pacific's remarkable policy of aggressive railway development. The projects that it has undertaken are so numerous and extensive that space permits merely mention of them. A large part of the program was put under way when the continuance of control of the Central Pacific was assured. It has included double tracking of the Ogden-San Francisco line, one of the most elaborate projects of that kind ever carried out by any railroad. Another phase has been the construction of the Natron cutoff hereafter to be designated by the Southern Pacific as the Cascade Line. This line will extend from Natron, Ore., to Black Butte, Calif., approximately 269 miles, and to date has cost about 40 million dollars. It will be an alternate route between San Francisco and Portland shortening the distance under the present Siskiyou line by 25 miles and having maximum grades of 95 ft. to the mile as against the Siskiyou line's maximum grades of 174 ft. The new line is to be opened for passenger service in the near future. In connection with this project there is also included further development of the Klamath Basin in southern Oregon which will make possible a new through route between the Willamette Valley and Klamath Basin and points on the main line across Nevada.

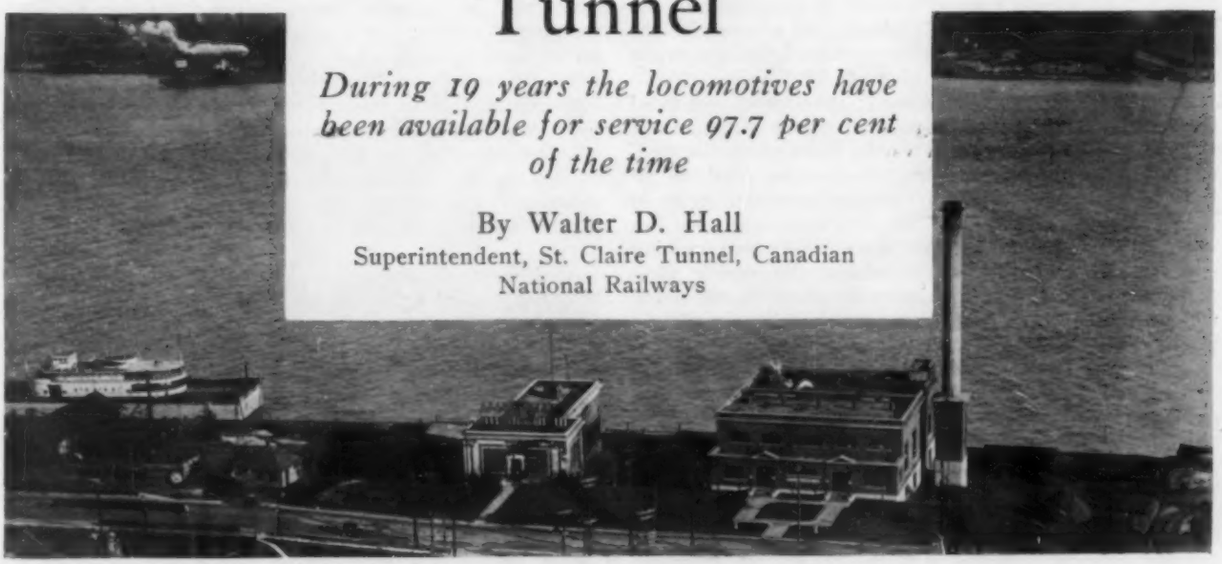
Another group of improvements followed with the acquisition of the El Paso & Southwestern. These were completed in 1926. They involved the construction of new main-line mileage in Arizona, the purpose of which, combined with the purchase of the El Paso & Southwestern, was to obviate the necessity of building urgently needed second-track between El Paso, Tex., and Dome, Ariz., 544 miles. The result has been to give the main line between El Paso and Yuma, Ariz., the equivalent of second track for all but 57 miles; to place Phoenix, Ariz., on a main line and to provide through direct service for the rich irrigated Salt River Valley.

The completion of the Southern Pacific of Mexico has already been mentioned and was covered in an article written by Raymond Chambers entitled "Southern Pacific of Mexico Finishes Main Line to Guadalajara" which appeared in the *Railway Age* of April 9, 1927.

Then, there has been an extensive program carried on in Texas, presumably having its inception in the increasing aggressive policies of the expanding Missouri Pacific. This has included unification of the Texas and Louisiana Lines by lease of the several properties to the Texas & New Orleans. Another feature was the re-acquisition of the San Antonio & Arkansas Pass (one of the companies since leased to the Texas & New Orleans) and the commencement of an elaborate construction program, giving this company entree into the rich Rio Grande Valley, hitherto served only by the Gulf Coast Lines, now part of the Missouri Pacific System. At present an application is pending before the Interstate Commerce Commission for an extension of the Southern Pacific's new line to the sea coast at Brownsville, Tex.

These are only selections of the expansion program that has been under way. The program has resulted in enormous expenditures as indicated by the fact that the investment in road and equipment of the company at the end of 1926 was 340 million greater than at the end of 1922. The increase in investment in road and equipment in the four years is equivalent to about $90 a share on the stock outstanding in the hands of the public at the present time. The improvements have been paid for out of earnings and from the sale of bonds including notably several important issues of equipment trust securities. The par value of the bonds actually in the hands of the public at the end of 1926 was, however, only about 140 million greater than at the end of 1922.

Operation Through the St. Claire Tunnel



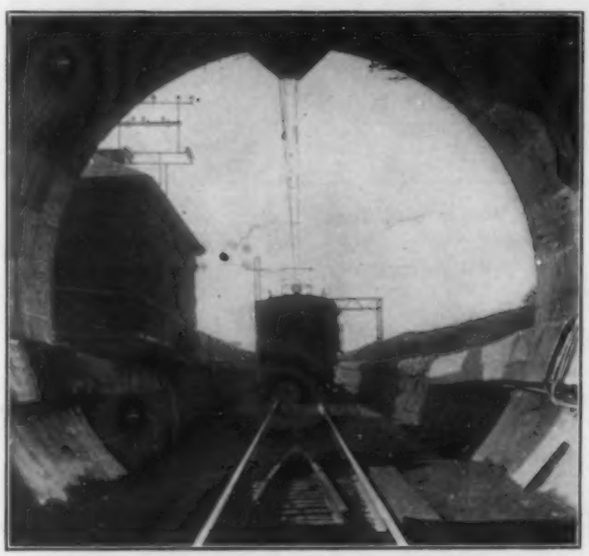
During 19 years the locomotives have been available for service 97.7 per cent of the time

By Walter D. Hall
Superintendent, St. Claire Tunnel, Canadian National Railways

Airplane View of Detroit Substation and St. Claire Tunnel Power Plant of the Grand Trunk

THE St. Claire tunnel on the Canadian National Railways which extends under the Detroit river between Port Huron, Mich., and Sarnia, Ont., Canada, was completed in 1891. It is 6,025 ft. long, with two approaches of about one-half mile each with two per cent grades at each end and in the tunnel cuts and about 1,718 feet of ½ per cent grade in the middle.

In September, 1891, 100-ton steam locomotives commenced operation through the St. Claire tunnel. These could handle a maximum of about 750 tons up the two per cent grades but frequently died before reaching the summit so that considerable time was lost in that way and on account of stopping for fire cleaning, coal and water. Business continued to increase and dioxide and monoxide gases made conditions dangerous so in 1903 serious consideration was given to electrification.



Tunnel Entrance and Electric Locomotive

Tunnel Electrification

In 1908 we inaugurated single phase electrical operation employing six 67½-ton Westinghouse-Baldwin electric locomotives. In 1908 these locomotives made 154,392 miles, hauled 288,516 cars and about 9,231,500 tons. Last year, 1926, these same locomotives made 248,025 miles, hauled 468,760 cars and about 19,696,708 tons.

It is 19 years this month since these locomotives were first operated through the tunnel; during that time they hauled 6,617,590 cars, 268,917,150 tons and made about 3,934,010 miles, an average of 655,660 miles per locomotive; during all these years there is not a total of one hour's delay charged to locomotive failures and in their nineteenth year, 1926, they were available for service 97.7 per cent of the time; the time not available was made up as follows:

	Per cent
Changing wheels, mostly due to soft tires	.57
Electrical, changing armatures, etc	.57
Mechanical, equalizers, brake rigging, pinions, etc	.33
Hydrostatic and hammer tests and other tests for government reports	.63
Derailment damage	.20
Total	2.3

The average cost of maintenance per locomotive mile, over this period of 19 years, was 9.45 cents. Last year, 1926, this cost was 6.21 cents per locomotive mile, cost per car mile .659 cents and the cost per ton-mile .015 cents.

Our single phase line voltage is 3,300. The locomotive auto-transformers have been rewound once and the commutators of the traction motors were renewed once. The fields of all motors have given practically no trouble. Five air compressor armatures have been repaired but we had practically no trouble with the blower motor armatures.

Controllers and wiring have given very little trouble, requiring only proper inspection and care. Three or four preventive coils have failed and practically all the union joints in copper rods from these gave trouble at some

*Abstract of a paper presented before the Heavy Electric Transportation Class of the Westinghouse Club.

time, apparently due to the pieces of fine copper gauze used in them; the gauze perishes and leaves a loose joint.

The pinions and gears have done remarkably well, considering that the drive is from one end of the armature shaft and that these locomotives are in terminal and not in main line service. Some pinions have exceeded 200,000 miles when removed. Some of the original gears are still in service, having made about 655,000 miles.

No locomotive trucks are used; the frames are rigid from end to end so that on account of the many curves encountered in the terminal yards, mileage of the tires was very low; because of sharp flanges we tried out oil and hard grease applied in various forms but without success.

In 1910, the yard steam engine tires were making about 42,000 miles between turnings; the electric locomotives were making a maximum of about 25,000 miles, which meant a lot of time lost over the pit as well as a big expense.

Therefore, Harry Rushbridge, who at this time was foreman in our electric locomotive repair shop, and I, realizing the seriousness of the situation, rigged up an old lubricator body with spray nozzles, similar in principle to an atomizer, so that the enginemen, by pressing a contact button at any of the controllers, could spray oil onto the wheel flanges when approaching curves. This scheme was so satisfactory that some of these tires made more than 150,000 miles between turnings and a total of more than 300,000 miles. The bearings of these locomotives have given practically no trouble.

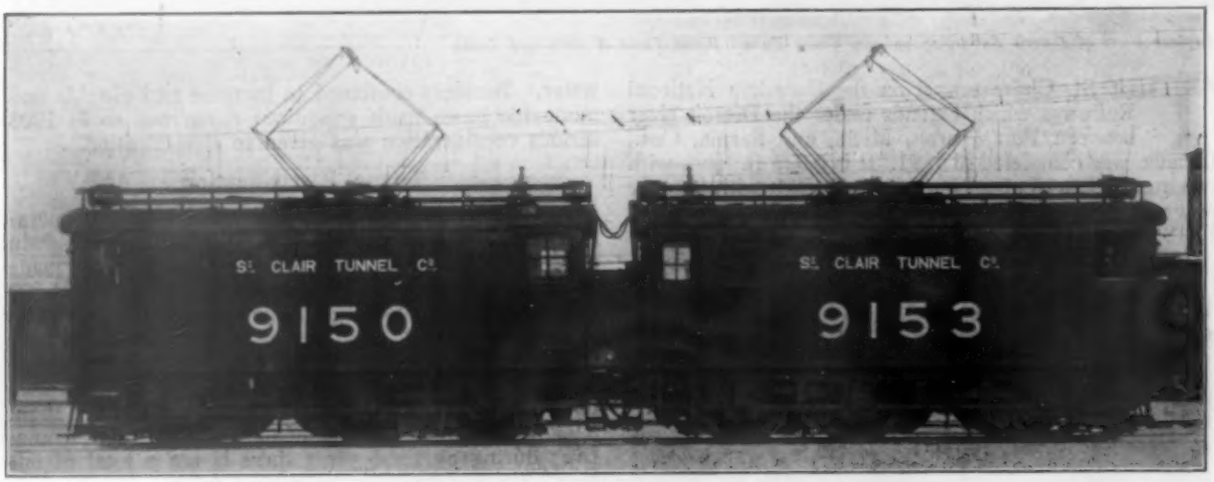
Overhead Lines

Some interesting things turned up in connection with insulation of the overhead lines. Strain insulators began to blow up during wet weather and it was found that due to a slight movement having taken place in the insulator, or perhaps due to expansion, the ends had cracked and soot and acid from steam locomotive gases was washed into these cracks during rain storms; we overcame this difficulty temporarily by making shields of sheet fibre which we wrapped around the insulators, allowing the shield to extend beyond the ends about 8 in.

As opportunity presented we installed other insulators which gave splendid service but even with these we experienced some difficulty when hauling heavy ore trains beneath them with steam locomotives; the exhaust gases and moisture would short circuit insulators and result in a short to the bridge structure; this trouble we overcame by placing two insulators in series a sufficient distance apart to prevent gases emitted from the locomotive stacks striking both insulators at the same time.

There were 480 insulating devices in the tunnel which supported two parallel trolley wires from two parallel messenger cables; the insulating medium was about 6 in. of impregnated wood. The two messenger cables were supported on "barrel type" porcelain insulators. Apparently, due to unequal expansion and contraction, the barrel type insulator would sometimes crack and during damp weather the 480 wood insulators allowed sufficient leakage to blow up the line. An average of eleven short circuits per year resulted from this cause and trouble was apt to occur at any time during the night or day.

The wood insulating devices were assembled with hexagon headed bolts and hexagon nuts and were very difficult to get at even with a box wrench. Thus a lot of time was lost in getting them clear of the line. To overcome this difficulty we made 480 insulating supports of ⅛ in. x 1 in. strap iron and standard 10,000-volt pin type insulators. This was in 1915 and since that time we have not had a single failure, although the barrel type insulators continue to crack, sometimes sections even break away and fall to the floor of the tunnel. In this device bolts square under the head and square nuts are used so that they can be easily and quickly removed from the line.



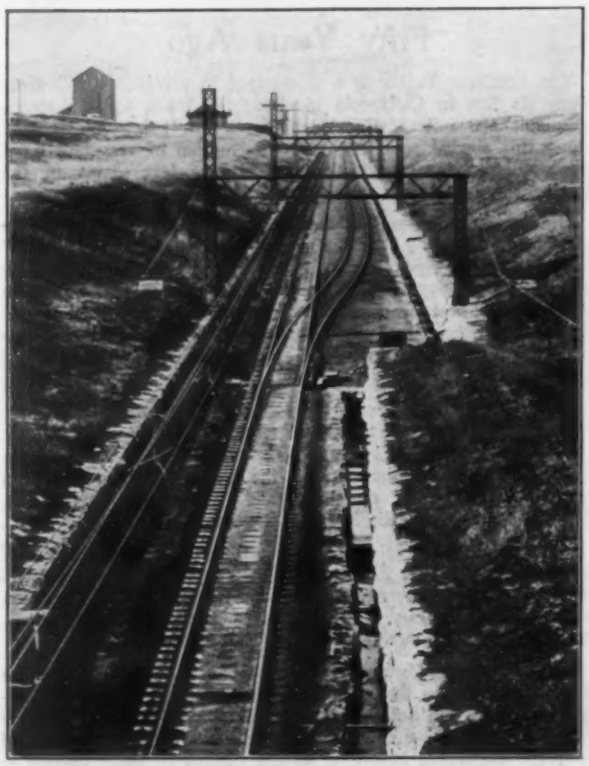
A Two-Unit Locomotive—Each Unit Weighs 67½ Tons

Power Plant

Our plant consists of two Westinghouse, 3-phase, 25-cycle, 3,300-volt turbo-generators, two barometric condensers, two engine driven exciters, one motor driven exciter and two air pumps on the main floor. In the turbine room basement are two engine driven circulating pumps of the centrifugal type (capacity 5,000,000 gallons each in 24 hours), one house pump and two engine driven stoker fans. The boiler room contains four B. & W. water tube boilers equipped with underfeed stokers, an independently fired superheater, two feedwater pumps and overhead gravity feed coal bunkers.

The turbines gave very good satisfaction during the 14 years the plant was in continuous operation and they still give good results when we are required to operate the plant, due to a failure of the power company. Oil stone marks on the spindles are just about as fresh as when these machines were placed in service. Some of the steel blading has been renewed because of failure of the

unlaced high pressure blades. During the war our north machine had a failure of this sort which resulted in bending the spindle .017 in. At that time, even with a priority order, it would have taken months to have straightened the spindle and installed new blades and to operate it



Overhead Construction and Track Arrangement Used on Tunnel Approach

bent as much as .017 in. seemed out of the question, so that it looked as though we were in a bad fix.

Mr. Neidhamer, a Westinghouse turbine erector, said there was very little hope of balancing a spindle of that length if bent more than .010 in. However, I told him of my faith in his ability and of the fix we were in, and also told him that I believed he might at least balance it so we could handle about a 500-ton train with what blades were left in the machine. Mr. Neidhamer succeeded in balancing the machine so that we could balance a nickel on the cylinder flange.

We put the machine on the line realizing that due to a shortage of blades, steam pressure and speed were likely to drop rapidly when a train started to climb the grade. I was on the turbine platform ready to close the secondary valve when this should occur. As the load piled up the machine began quickly to slow down. I closed the secondary valve using only the primary; the machine quickly regained speed, carried the load splendidly and has operated through only the primary valve since that time, because it was not advisable to add more blades when we were getting such good results with what blades were left in the machine.

The stators of the turbo-generators did not give any trouble but after about six years we had the fields rebuilt because of indications of insulation failure.

During a severe electrical storm, some years ago, the stator at the 3,300-volt end of the main exciter burst into flame. We extinguished the fire, changed to a steam exciter, cut out the damaged coils and put the main exciter back into service until repairs could be made; this was done without interruption to service because the motor operated on one-phase while we were changing to the steam exciter.

The water tube boilers and stokers have given excellent results, especially when it is considered how erratic the load conditions are. During the entire 19 years, very few boiler tubes have been renewed, although the three boilers with a combined rating of only 1,200 hp. are called upon to deliver 3,000 hp. at frequent intervals.

The steam driven auxiliaries have given very good results but the cost of maintenance of reciprocating boiler feed pumps, largely due to cost of labor and material for packing, is much greater than that cost for the centrifugal pumps.

This steam-electric plant operated continuously for 14 years with the responsibility of handling a large and important volume of business between Halifax and other points of our railroad in the east and our Chicago terminal in the west, and during these years there is only 15 minutes charged to the plant due to avoidable delay.

Glen Park Yard of the Missouri-Kansas-Texas at Kansas City, Mo.

New Books

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Group Railway Map of the British Isles. New edition, showing the systems in colors, heights of stations above sea-level, and other details. Pub. by John Bartholomew & Son, Ltd., Edinburgh, Scotland. 2s. 6d.

Hammond Mercantile Atlas of the United States of America. Includes also reference maps of the world, detailed State maps showing railroads and interurban lines, air mail routes, highway routes, post-offices, etc. Thoroughly indexed. Pub. by C. S. Hammond & Co., Inc., New York.

Making Transportation Pay. 1926, edited by Henry H. Norris, for the Charles A. Coffin Foundation. The suggestions and practices entered for the C. A. Coffin awards by the various electric railway companies. 244 p. Pub. by American Electric Railway Association, New York City. $2.

The Story of Transportation, by Jeanette Eaton. A gay little book written and illustrated primarily for active and inquisitive youngsters in answer to several varieties of "Why" and "Whats" about forms of transportation. 52 p. Pub. by Harper & Bros., New York City. $1.25.

The Common Interests of the Mining and Railway Industries, by Robert Bell. The Assistant General Manager of the London & North Eastern discusses coal and other mining industries in Great Britain in connection with railway development. 15 p. Pub. by London & North Eastern Railway Company's Works, Stratford, Eng., Apply.

Trans-Australian Railway. The brief text, and the photographs in this article supply the answers to the several most-frequently-asked questions about this railway, together with additional information. Baldwin Locomotives, April, 1927, page 51.

Periodical Articles

"The Danger Line" in Wood Poles. Insects, plant growths, and other impediments to the service life of wood poles for telegraph and telephone lines, and methods of eradication and prevention. Stone & Webster Journal, April, 1927, p. 484-493.

The Great Cascade Tunnel—a New Chapter in the Romance of Railroad Building, American Magazine, May, 1927, p. 38-41, 158-160.

New Sleeping Cars on European Railroads, by H. H. Kelly. Illustrated article describing the types used on the Nord Express, the Orient Express, the Calais-Mediterranean Express, the Paris-Geneva and Berlin-Vintimille runs. Commerce Reports, April 18, 1927, p. 147-148.

The Steam Locomotive in the Past and the Future, by J. F. Gairns. Retrospect for the past 50 years, and prospect looking towards greater usefulness of steam motive-power and co-ordination with other forms of transportation. Nineteenth Century and After, March, 1927, p. 352-362.

Water Supply for Army Railways in France, by Paul M. LaBach. What they found, how it was used, and suggestions for future organization. Proceedings of the American Society of Civil Engineers, April, 1927, part 1, p. 540-562.

Birmingham—the Next Capital of the Steel Age, by Neil M. Clark. Railroad and water traffic, p. 535-541. World's Work, March 1927, p. 534-545.

State Control of Transport, by Robert Bell. Characteristics and results. Journal of the Institute of Transport, January 1927, p. 129-139.

Looking Backward

Fifty Years Ago

The Southern Pacific is now engaged in planting 40,000 trees along its line in California to shade the track for a distance of about 400 miles. Eucalyptus trees are being interspersed along this shaded route to insure exemption of travelers from the autumnal fevers prevalent on the treeless plains of the Pacific slope.—*Chicago Railway Review,* April 21, 1877.

Quite a sensation was created at the Chicago & Alton station at Chicago on April 5 by the arrival of a "summer and winter" refrigerator car from Pueblo, Colo., loaded with beef. Though eight days on the road, with the thermometer at 90 deg. in Kansas, the beef was found to be in perfect condition and fit for immediate use. Fruit and vegetables have been transported with equal success.—*Chicago Railway Review,* April 21, 1877.

Twenty-Five Years Ago

W. G. Bierd, trainmaster on the Lehigh Valley, has been appointed trainmaster on the Grand Trunk at Battle Creek, Mich.—*Railway and Engineering Review,* April 26, 1902.

An official test was made on April 24 of an installation of block signals on the Chicago, Milwaukee & St. Paul equipped with automatic safety stops which apply the brakes of the train if an attempt is made to run past a signal set at danger.—*Railway and Engineering Review,* April 26, 1902.

The Interstate Commerce Commission has decided, through a case brought by the citrous fruit shippers of Southern California against the Southern Pacific and the Atchison, Topeka & Santa Fe, that these companies are not justified in their refusal to route shipments according to the desires of their patrons.—*Railway Age,* April 25, 1902.

Ten Years Ago

The Great Northern and the Northern Pacific have issued bulletins stating that all of their men enlisting in the army and navy will have their positions restored to them upon returning from such service and that seniority and pension rights will be retained.—*Railway Review,* April 21, 1917.

The Pere Marquette was reorganized at a meeting held in New York on April 11, with E. N. Brown, formerly president of the National Railways of Mexico, as chairman of the board of directors, and Frank H. Alfred, general manager for the receivers, as president and general manager.—*Railway Age Gazette,* April 20, 1917.

"To the men who run the railways of the country, whether they be managers or operative employees, let me say that the railways are the arteries of a nation's life and that upon them rests the immense responsibility of seeing to it that those arteries suffer no obstruction of any kind, no inefficiency or slackened power."—From the proclamation by President Woodrow Wilson, to the people on April 15, 1917.—*Railway Age Gazette,* April 20, 1917.

For the purpose of removing any possible question as to the power of the President to use the transportation and communication facilities of the country during war time, Representative Adamson, chairman of the House Committee on Interstate and Foreign Commerce, on Friday introduced in Congress a bill which not only gives the President power to take possession of railroad, telegraph and telephone lines and to draft their officers and employees into the service of the government, but also gives him power to issue orders for the operation of any lines or parts thereof. The bill has the backing of the administration and is considered a part of the legislative war program.—*Railway Age Gazette,* April 20, 1917.

Odds and Ends of Railroading

Naming the "Babies"

If we name our locomotives
What gender shall we use?
Given the name of "Henry"
Would seem a bit obtuse.
Suppose "her" flues were leaking,
Or we want to give "her" sand,
Just saying, "him," or "Henry"
Would your forces understand?

When we talk of locomotives
Everybody will concur;
"Horatio," "Steve," or "Jasper"
Doesn't coincide with "her."
If they *must* be cognomened,
Lest we perpetrate a fraud,
If we know our railroad onions
We'll stick to names like "Maud."

J. B. SEARLES.

Anent the naming of locomotives, a Democratic paper suggests applying the heroic names of Washington and Lincoln to the real giants of the rails, reserving the names of prominent Republican leaders for the narrow-gage lines. We sincerely hope that no one will go so far as to suggest that hand-cars be named for leading "Progressives."

That many commuters pay less for their ride to the city each day than a 'phone call would cost them, was an interesting fact brought out by a prominent railroad officer recently speaking before a group of citizens in a town which is a suburb to one of our large metropolitan centers. The ride to the city in this particular instance costs 17 cents, whereas the telephone toll rate is 25.

According to army orders, Baltimore & Ohio trains will each "carry 1½ officers and 190 men through Washington and Chicago to the Pacific Coast." Some persons may be mystified as to just what half an officer is, but reference will be readily understood by anyone who served during the recent unpleasantness in France. The order refers to a second lieutenant of Infantry.

While out on his regular beat one frosty morning recently, Trackwalker Pete McCafferty of New Bethlehem, Pa., according to the Pennsylvania News, noticed something on the rail some distance from him. As he neared the object he discovered it was a squirrel with its feet frozen to the frosty rail. The little animal showed fight and tried to bite Pete but he finally succeeded in liberating it.

Africa is a land of strange things, and not the least strange is the "chewing gum railway" which runs from Khartoum to El Obeid, in the Sudan. This railway is 430 miles long and crosses the Nile at Kosti on a bridge 1,500 ft. long. It was built for the sole purpose of transporting gum from the interior to the Nile. The value of the gum transported annually is about $10,000,000, and much of it eventually finds its way to the eager mouths of stenographers in America.

Among the unusual railroads of the country is the Galesburg & Great Eastern, which is ten miles long and is owned by farmers and business men of Victoria, Ill. The method of hailing trains, on this railroad is very simple. The prospective passenger merely walks out on the right of way and holds up his hand. Similarly, when a passenger wishes to get off, the train will be stopped for him in the exact spot he selects. Instead of having to walk or drive home from the station, he can have the train stopped behind his barn and walk right in on the folks.

The Shoshone Indians have pledged their eternal friendship to the Union Pacific. This impressive ceremony took place at Pocatello, Idaho, recently. Chief Tendoy of the Shoshones, in full tribal regalia and surrounded by his council, received from a representative of the railroad an eagle feather, which the chief had sent to Carl R. Gray, president of the U. P. a year ago, with instructions to return it in 12 moons. The return of the feather sealed the bonds of everlasting friendship between the Indians and the railroad, and Chief Tendoy, in conclusion, pleaded that the aggressive and stronger race show tolerance and brotherhood towards the Indians.

Happenings that would make interesting bits of "business" for movie scenarios are constantly occurring on the railroads. Garland Bowman, 17, a high school boy of Walnut, Kan., is the hero of the most recent episode of this character. Early one morning, a week or two ago, Garland found a washout on the Missouri-Kansas-Texas, near Walnut. To reach the station, it was necessary that he swim a flooded creek and run nearly a mile. When he arrived at the station, it was discovered that the next train, which was full of U. S. marines going to the Pacific Coast, was almost due at the point where the washout occurred. Garland and the agent picked up several fusees and ran back towards the washout. As they neared it, they realized that they could not get across the creek in time to stop the train. Lighting their flares, they waved them frantically and the train stopped just before reaching the washout.

The Light Legal Literary Style

Some fairly complicated and technical language gets into a court or commission decision on a railroad valuation case. So perhaps the United States Circuit Court of Appeals for the eighth circuit, after having dealt with that kind of language to the extent of several thousand words in a case involving the valuation of the Denver Tramway Company, may be excused for showing off a little as to its own command of non-technical language in the concluding paragraph, as follows:

The sum of appellants' numerous contentions is, in the last analysis and when expressed in the vernacular, that appellees may not, as the Devil is said to have done in the legendary incident, "blow hot and cold." Conceding, arguendo, that equity in some situations frowns faintly, at least, on the inconsistency to be inferred from a too tempestuous exsufflation of calidity when immediately followed by a similar exsufflation of frigidity, yet the inequities which follow, if any, even when the faults are laid at the right door, are to be measured by fairly well-settled rules and not "by the length of the chancellor's foot." Measured by such settled rules we are constrained to conclude that the decree below was correct.

The Good Old Days

Among the items in the estimate of the cost of construction of the St. Paul, Rochester & State Line, projected to link St. Paul, Minn., with the Iowa state line, 120 miles, in April, 1877, are the following:

"For grading, bridges and culverts, $3,000 per mile; for ties at 40 cents each, $1,000 per mile; for iron, 56 lb. to the yard and $45 per ton, $3,960 per mile; for laying track, $150 per mile; for ballasting track, $300 per mile; for buildings, $300 per mile; for four turntables, $3,000; for three engine houses, $12,000; for five locomotives, $40,000; for eight baggage cars, $18,000; for 12 passenger cars, $44,000; for 100 box cars, $50,000; for 100 flat cars, $40,000; engineering expenses, $10,000.

"This estimate allows for a depot in every township, but no allowance is made for the cost of the right-of-way which it is expected will be donated by the towns through which the road will pass. The foregoing figures are regarded by engineers and railroad men as too liberal by from 10 to 30 per cent, and that the road can be built and equipped for $10,000 per mile. Ties can be furnished at 22 cents instead of 40 cents each. Numerous other calculations are equally high."

It might be pertinent to add that the railroad was not constructed under these or any other estimates.

NEWS *of the* WEEK

Florida East Coast—Photo by M. B. Cooke

THE NEW ENGLAND RAILROAD CLUB will hold its annual banquet on May 10 at the Copley-Plaza Hotel.

THE WESTERN RAILWAY CLUB will hold its annual dinner on May 17 at the Hotel Sherman, with Max Mason, president of the University of Chicago, as speaker.

A FIRE in the yard of the Pennsylvania at Camden, N. J., on the night of April 17, destroyed six passenger coaches and damaged a number of others; estimated total loss $125,000.

THE CLEVELAND RAILWAY CLUB will hold its next meeting on May 2 when a paper will be read on "How to Improve Design and Maintenance of Cars," by F. J. Herter, engineer of rolling stock, of the Nickel Plate.

THE ST. LOUIS RAILWAY CLUB will hold its next meeting on May 13 at the Hotel Statler when a paper will be read on "This is the Age of Riveted Steel," by A. F. Jensen, president, Hanna Engineering Works.

THE CENTRAL RAILWAY CLUB will hold its next meeting on May 12, at the Hotel Statler, Buffalo, when a paper will be read on "Limited Engine Cut-Off" by H. S. Vincent, of the Franklin Railway Supply Company.

WORTH ALLEN, of Greeley, has been appointed member of the Colorado Public Utilities Commission for a term of six years, succeeding Frank P. Lannon. Mr. Allen has been engaged in the practice of law at Greeley since 1919 and prior to that time he practiced law at Chicago.

THE RAILWAY CLUB OF PITTSBURGH (PA.) will hold its regular meeting at Fort Pitt Hotel, Pittsburgh, on Thursday evening, April 28, beginning at seven o'clock, Eastern time. The regular dinner will be held at five o'clock, Eastern time. The speaker at the meeting will be C. A. Seley, Locomotive Firebox Company, who will discuss corrosion and pitting in locomotive boilers.

A DEMAND has been made by the Canadian Council of Agriculture, representative of the Progressive political elements in Western Canada, with headquarters in Winnipeg, that there be a reorganization of the Dominion Railway Board to provide for seven members, instead of six as is now the case, and that three of the seven represent Western Canada.

Arbitration for Trainmen

The United States Board of Mediation on April 16 announced the appointment of Dr. W. M. W. Splawn, president of the University of Texas, and Edward C. Brown, of Chicago, as the neutral arbitrators in the wage controversy between the western railroads and the Order of Railroad Conductors and the Brotherhood of Railroad Trainmen. The other members of the arbitration board are W. J. Jackson and J. W. Higgins (for the railroads), and E. P. Curtis (conductor), and J. A. Farquharson (brakeman).

S. P. Clerks' Pay Raised

Wage increases ranging from two to seven cents an hour have been awarded to clerks, baggage handlers and station employees on the Pacific lines of the Southern Pacific by the Board of Arbitration appointed to consider the matter. The increases inure to the benefit of 9,954 employees and will make necessary an additional expenditure by the railroad of about $1,500,000 annually. The members of the Board of Arbitration were W. B. Kirkland (Southern Pacific), J. H. Sylvester (Brotherhood of Clerks) and J. O. Davis of Berkeley, Cal.

Fuel Cost in February

The average cost of railroad fuel coal in February was $2.69 per ton, as compared with $2.62 in February last year, according to the Interstate Commerce Commission's monthly summary of railroad fuel statistics. The figures include only fuel for road locomotives in freight and passenger service charged to operating expenses for Class I steam roads, not including switching and terminal companies. The average cost of fuel oil per gallon was 2.98 cents, as compared with 2.90 cents last February. For the two months ended with February the average cost of coal was $2.71 and the average cost of oil was 2.98 cents. The total cost of coal and fuel oil for the two months was $56,731,491, as compared with $55,441,805 last year.

U. S. Army Reserve Corps News—Railway Units

E. H. Lewis, supervisor, Illinois Central, with headquarters at Jackson, Miss., has been appointed first lieutenant, Engineers Reserve.

Henry L. Stanton, engineer of telegraph and signals, Pennsylvania, western region, with headquarters at Chicago, Ill., has been appointed first lieutenant, Engineers Reserve.

Captain Frederic T. Huston, master mechanic, Pennsylvania, with headquarters at Erie, Pa., has been assigned to the 493rd Engineer Railway Battalion, G. H. Q. Reserve. This notice was published in the March 5, 1927, issue of the *Railway Age* as second lieutenant, instead of captain.

Medals for Heroic Service

The directors of the Pennsylvania have awarded heroic service medals to Frank W. Geary, freight brakeman; James B. Deegan, freight conductor and Fred Lintner, engineman, for extraordinary bravery. Mr. Lintner is an employee of the New York Central, not the Pennsylvania, but the medal is awarded with the approval of the New York Central.

These three men, living in Titusville, Pa., left their homes on an alarm of fire on Sunday forenoon, December 19; and on arriving at the fire, at the plant of the American Oil Works, adjacent to Pennsylvania tracks, discovered five tank cars loaded with oil which were directly in the path of the flames. Securing a New York Central locomotive, which happened

to be near, they moved the engine through the transfer yards to the oil works and hauled the five cars away to a safe position. The cars at the time were dangerously hot and the waste in the journal boxes was on fire. The oil tanks were badly warped and apparently about ready to explode. The cars having been brought to a standstill, the fires in the journal boxes were put out with extinguishers, and the city fire department cooled the tanks with water.

The directors of the Pennsylvania began awarding medals of this kind four years ago; that to Engineman Lintner is the first which has been given to anyone except an employee of the Pennsylvania.

Record Run on Florida East Coast

A special train of a locomotive and two sleeping cars, run over the Florida East Coast on the evening of Friday, April 8, from Miami, Fla., to St. Augustine, traversed the 310 miles between these cities in five hours, eight minutes, equal to 60.4 miles an hour. Stops for water and inspection took up 15 minutes, leaving the time in motion 293 minutes, making the speed 63.5 miles an hour.

The train was run for the purpose of taking members of the family of Vice-president H. N. Rodenbaugh on their way to a hospital at St. Augustine, Mrs. Rodenbaugh being sick at that place. The locomotive was mountain type No. 428. The train left Miami at 6:22 p. m. and arrived at St. Augustine 11:30 p. m.

C. P. R. to Operate Hereford Railway, Idle Since 1925

Following a conference between Charles A. Dunning, Minister of Railways at Ottawa, and Jacob Nicol, Provincial Treasurer of Quebec, it was announced in Montreal this week that the Canadian Pacific, instead of the Canadian National, would operate the Hereford Railway. The Exchequer Court of Canada is preparing a final deed, and at the last moment the Canadian Pacific offered to take over and operate the Hereford line, so that the Minister of Railways has, on behalf of the Canadian National Railways, accepted this offer.

The Hereford Railway, which extends from Lime Ridge, Que., to the United States border (about 50 miles) has not been operated since November, 1925. The line was leased for ninety-nine years by the Maine Central whose officers later secured control of the Hereford bonds and decided to cancel the lease. Action was taken by the provincial and federal government, and that the case was taken to the Exchequer Court asking authority to sell the line. Some time ago the offer of the C. N. R. to operate the line was accepted by the court, and according to the terms of the tender of the C. N. R. was to give a continuous service from Cookshire to Malvina by a train running at least every two days, leaving Sherbrooke in the morning and returning at night. Since the operation of the Hereford line was discontinued several towns suffered severely from lack of transportation facilities and every effort has been made to improve the situation. Private individuals secured the right to operate freight over the line, mainly wood, and cars were drawn by motor cars equipped with suitable wheels to hold to the rails.

Mississippi Valley Flooded

Train service on practically every railroad operating in the Mississippi valley south of St. Louis, Mo., has suffered interruption since April 10 and on April 19 at many points the peak of the high water had not yet been reached.

The Illinois Central and the Mobile & Ohio have experienced acute difficulties at Cairo, Ill., where the Mississippi river on April 18 had reached a level 1.6 ft. above the previous high water record (1913). The turntable and roundhouse of the Illinois Central at Mounds, Ill., have been abandoned because of high water while south of Memphis, Tenn., water covered the tracks although alternate routes make operation possible. Mobile & Ohio trains in the vicinity of Cairo were routed over the Illinois Central.

On the St. Louis-San Francisco the situation along the Mississippi and its tributaries has been acute since April 12. At Cape Girardeau, Mo., the river had reached the highest known record on April 19, but although the water was over the tracks at several points, causing some interruption to service no main line track had been abandoned.

Rains have continued throughout practically the entire Missouri-Kansas-Texas territory since April 5, resulting in washouts at a number of points. The most serious occurred on the night of April 7, following a cloud-burst in the vicinity of Erie, Kan. In the Verdigris river bottoms north of Muskogee, Okla., the main line near Benson, La., was washed out. The Arkansas river reached its flood stage on April 14 and covered the branch to Fort Smith, Ark., for a distance of one-half mile. South of Redland, Ark., the water submerged about one and one-half miles of main line.

The Rock Island lost several bridges along the South Canadian and the North Canadian river crossings. Trouble was also experienced with high water along the Missouri river west of St. Louis, Mo. A cloud-burst at Wister, Okla., washed the railroad buildings from their foundations. At Yukon, Okla., the opening of a dam carried away two spans of a steel bridge.

In the vicinity of Wellington, Kan., several bridges on the Santa Fe were washed out.

Peace River Debate Continues

Another debate on a railway outlet for the Peace river country in northwestern Alberta to the Pacific Coast was staged in the House of Commons at Ottawa last week and resulted in a vote on the amendment of Donald M. Kennedy (Peace river) to the railway committee report to ensure an earlier start on the project, his amendment being defeated by 77 to 107, the Conservatives voting with the Alberta Progressives and Labor members for the amendment and the Liberals and Liberal-Progressives against it.

Robert Gardiner, Alberta Progressive leader, in the debate said:

"The even-numbered sections in most parts of the west, chiefly in Alberta, are left for homestead purposes. Sometime about the year 1910 the Department of the Interior advertised the Peace river country as a splendid place for new settlers, and people went there on the understanding that within a reasonable time they would be provided with transportation facilities. We maintain that, a certain policy having been pursued over a number of years, it is now the duty of the federal government when they open these lands for settlement purposes to see that the transportation facilities required by the people are provided."

Charles Stewart, Minister of the Interior and Alberta's representative in the federal Cabinet, said:

"As one who has been interested for almost twenty years in the Peace river country and who, I believe, recommended to the Alberta government the construction of the Edmonton-Dunvegan railway to serve the people of that territory, I can say with some assurance that I know something about the situation there. I traveled through that district before there was a railway in the country, my object being to advise the provincial government what should be done.

"The Canadian National Railways projected a line into the Peace river country by White Court, crossing the Macleod river and heading for the Peace river pass. In my opinion no other road will serve the country as acceptably as the route by the Peace river pass, and I have never thought otherwise. I believe the reconnaissance surveys made at that time amply warrant that statement; it is the only outlet that will properly serve that whole country. Other routes have been discussed but they will all entail a longer mileage and a more expensive haulage than the road by the Peace river pass . . . So far as I am concerned, with the information before me, I am perfectly agreeable to the suggestion of an immediate survey in order to submit to the House at the next session all the evidence available, and to have parliament take action thereon at that time."

Charles A. Dunning, Minister of Railways and Canals, in concluding the debate said, in part:

"I can assure my hon. friend that every consideration will be given along that line to the views of the governments of Alberta and British Columbia. . . . I do not want to find myself in the position of being represented as opposing the development of the Peace river area . . . I submit that a fair calculation of what would be really involved, to carry out the desires of the governments of the two provinces and to build the outlet as well, would fall not very far short of $85,000,000 before we got through with it, and for that reason I do not think it fair to press the government to a commitment on an enterprise of such proportions immediately."

Freight Operating Statistics of Large Steam Roads—Selected Items for February, 1927,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1927	407	212,031	226,785	24,343	4,482	66.8	234,559	89,816	114	14	11.1	7
	1926	407	230,013	252,174	30,398	4,354	72.7	214,883	84,481	117	12	9.3	1
Boston & Maine	1927	2,085	448,028	511,667	43,083	11,157	69.4	570,245	223,010	281	81	22.4	17
	1926	2,250	448,993	511,905	42,920	10,909	76.7	515,410	211,198	316	96	23.2	52
N. Y., New H. & Hartf.	1927	1,884	463,365	488,826	33,323	12,349	68.2	641,006	256,190	277	65	19.0	11
	1926	1,892	421,155	433,708	34,240	11,097	73.5	534,244	215,943	260	51	16.3	23
Great Lakes Region:													
Delaware & Hudson	1927	875	330,926	450,158	49,727	9,023	61.3	591,877	286,265	254	30	10.4	85
	1926	875	315,820	430,336	48,432	8,392	65.9	503,363	244,328	248	38	13.2	100
Del., Lack. & Western	1927	999	507,366	579,402	67,808	15,880	67.9	893,113	383,661	272	50	15.5	20
	1926	993	455,645	534,194	61,737	13,882	71.1	717,703	291,454	280	62	18.1	67
Erie (inc. Chi. & Erie)	1927	2,317	956,911	1,061,135	110,152	33,272	64.1	2,056,794	898,281	540	112	17.2	76
	1926	2,323	904,563	990,298	102,682	30,118	63.7	1,822,785	793,541	595	103	14.8	152
Lehigh Valley	1927	1,346	532,987	581,909	63,375	15,747	62.8	931,483	398,701	379	67	15.1	54
	1926	1,345	489,469	538,395	75,492	14,453	68.1	796,770	340,298	409	90	18.1	96
Michigan Central	1927	1,820	539,325	559,848	16,607	17,784	60.8	995,343	358,009	244	67	21.6	62
	1926	1,835	549,705	566,348	17,575	18,688	64.9	983,205	349,488	274	59	17.7	84
New York Central	1927	6,478	2,036,398	2,357,800	167,030	74,335	61.0	4,710,794	2,088,856	1,100	341	23.7	192
	1926	6,482	2,127,018	2,438,129	184,845	72,274	62.3	4,425,818	1,935,239	1,119	328	22.7	115
New York, Chi. & St. L.	1927	1,665	602,794	607,404	6,497	18,927	63.5	1,067,215	413,766	238	55	18.8	54
	1926	1,665	608,928	618,373	5,057	18,476	67.0	1,001,256	399,717	245	67	21.6	50
Pere Marquette	1927	2,181	420,497	427,430	7,585	10,618	61.3	646,596	276,241	183	34	15.6	25
	1926	2,198	394,057	402,204	4,947	9,873	63.7	573,824	242,095	190	27	12.3	22
Pitts. & Lake Erie	1927	231	129,241	129,817	1,096	4,411	58.6	357,306	200,194	51	17	25.0	5
	1926	231	138,609	139,472	987	4,502	58.8	380,605	191,548	64	14	17.9	14
Wabash	1927	2,497	730,563	761,939	12,627	21,428	63.0	1,237,521	469,564	316	58	15.4	48
	1926	2,497	674,869	703,216	10,201	20,501	67.1	1,119,069	441,483	311	61	16.3	57
Central Eastern Region:													
Baltimore & Ohio	1927	5,220	1,862,881	2,191,934	185,483	52,396	59.5	3,588,845	1,705,585	1,004	218	17.8	45
	1926	5,197	1,884,390	2,248,832	193,263	52,900	62.7	3,468,767	1,682,378	983	227	18.8	25
Central of New Jersey	1927	691	240,632	261,936	29,913	6,516	57.8	440,265	209,661	193	34	14.9	12
	1926	691	254,572	283,204	38,826	6,199	62.3	411,273	194,734	244	26	9.6	47
Chicago & Eastern Ill	1927	945	303,746	311,748	4,894	7,731	60.1	517,970	249,055	109	48	30.5	9
	1926	945	255,447	256,441	3,890	6,863	62.6	419,983	195,729	116	39	25.3	23
Clev., Cin., Chi. & St. L.	1927	2,374	757,166	791,133	25,122	22,923	59.8	1,565,416	739,757	343	93	21.3	11
	1926	2,374	703,788	731,729	23,272	21,161	61.6	1,371,897	642,102	323	96	22.9	5
Elgin, Joliet & Eastern	1927	461	142,301	150,627	7,093	3,975	60.1	317,510	164,709	85	8	8.7	...
	1926	460	125,837	134,138	6,294	3,624	62.9	273,463	141,259	83	13	13.8	...
Long Island	1927	393	39,263	41,164	10,771	497	55.3	32,665	12,308	42	9	17.7	...
	1926	393	38,872	44,220	11,371	460	58.3	29,821	11,898	40	9	18.4	1
Pennsylvania System	1927	10,843	4,510,050	4,950,196	388,692	125,357	61.7	8,490,704	3,967,481	2,868	433	13.1	375
	1926	10,879	4,872,458	5,394,394	476,908	130,970	64.3	8,649,123	4,149,254	2,710	565	17.3	64
Reading	1927	1,130	643,806	703,906	71,778	16,390	56.9	1,213,092	611,917	326	69	17.5	22
	1926	1,129	700,144	780,639	83,680	17,454	59.7	1,252,643	648,596	368	69	15.7	49
Pocahontas Region:													
Chesapeake & Ohio	1927	2,651	1,155,282	1,249,247	50,839	36,651	54.4	3,047,318	1,626,027	555	88	13.6	31
	1926	2,633	1,174,196	1,292,764	46,442	35,353	57.2	2,802,941	1,524,956	529	89	14.4	12
Norfolk & Western	1927	2,232	812,484	990,712	34,743	27,912	58.2	2,341,011	1,250,595	544	57	9.4	95
	1926	2,231	871,599	1,085,631	50,719	28,003	59.8	2,317,491	1,260,793	569	65	10.3	96
Southern Region:													
Atlantic Coast Line	1927	4,996	779,662	784,558	13,124	20,386	58.5	1,178,750	436,207	429	50	10.4	58
	1926	4,924	891,100	903,028	15,547	21,653	60.8	1,241,150	481,670	406	51	11.2	10
Central of Georgia	1927	1,898	281,097	283,472	7,014	7,061	70.9	382,802	168,448	143	20	12.4	12
	1926	1,907	334,187	337,119	6,048	7,504	71.6	413,749	189,718	155	25	13.7	20
I. C. (inc. Y. & M. V.)	1927	6,555	1,863,772	1,870,216	42,340	50,803	61.9	3,360,723	1,489,313	807	92	10.2	19
	1926	6,555	1,813,067	1,826,831	36,901	50,050	65.0	3,103,921	1,372,585	796	107	11.9	11
Louisville & Nashville	1927	5,044	1,669,445	1,739,389	59,101	33,727	58.3	2,363,359	1,135,844	598	116	16.3	1
	1926	5,021	1,771,879	1,902,924	67,493	34,647	61.8	2,323,648	1,144,088	603	112	15.7	...
Seaboard Air Line	1927	4,237	578,556	591,213	10,433	14,632	63.1	854,342	344,189	243	45	15.5	...
	1926	3,905	593,503	602,264	10,661	14,855	66.3	833,003	339,935	264	31	10.5	...
Southern Railway System	1927	8,021	1,942,030	1,974,713	35,140	48,056	63.1	2,777,794	1,136,234	1,083	165	13.2	28
	1926	8,043	2,125,376	2,174,625	47,095	50,083	65.0	2,850,279	1,187,523	1,025	163	13.7	32
Northwestern Region:													
Chi. & North Western	1927	8,461	1,414,093	1,467,931	30,949	33,174	61.7	2,008,706	779,581	749	154	17.0	91
	1926	8,455	1,338,367	1,377,504	22,923	31,114	63.2	1,799,033	731,520	739	200	21.3	90
Chi., Milw. & St. P.	1927	11,197	1,485,713	1,579,321	93,249	41,505	63.3	2,463,919	1,065,963	796	196	19.8	138
	1926	11,202	1,415,396	1,522,077	86,248	40,294	65.7	2,285,616	994,881	894	204	18.6	188
Chi., St. P., Minn. & Om.	1927	1,724	297,130	317,364	15,415	6,004	65.6	336,510	142,150	157	35	18.4	...
	1926	1,819	291,534	312,559	12,947	5,677	65.5	312,068	128,802	169	33	16.2	4
Great Northern	1927	8,164	673,273	698,642	42,501	21,304	68.1	1,218,890	553,422	564	155	21.5	151
	1926	8,222	663,082	686,544	37,348	21,418	66.4	1,220,323	534,714	608	145	19.3	169
M., St. P. & S. Ste. M.	1927	4,368	478,160	489,969	4,688	11,217	67.5	607,984	271,354	296	33	9.9	23
	1926	4,372	486,629	497,354	4,465	11,415	69.0	593,442	262,755	297	44	12.8	25
Northern Pacific	1927	6,505	688,966	726,530	39,861	22,011	73.8	1,185,286	550,515	488	151	23.6	110
	1926	6,510	731,148	768,638	41,716	23,445	72.1	1,290,937	597,560	521	140	21.1	103
Oreg.-Wash. R. R. & Nav.	1927	2,164	167,935	177,127	13,813	4,917	73.1	278,578	130,058	140	21	13.2	15
	1926	2,185	162,999	173,811	14,088	4,882	70.6	273,181	121,759	142	21	12.9	14
Central Western Region:													
Atch. Top. & S. Fe. (incl. P. & S. F.)	1927	10,356	1,558,401	1,665,939	84,007	47,447	63.4	2,845,678	1,112,210	747	165	18.1	109
	1926	10,143	1,349,940	1,432,691	71,456	40,118	63.8	2,351,717	892,335	793	164	17.1	233
Chicago & Alton	1927	1,022	294,487	316,720	5,564	6,709	55.8	450,489	182,207	138	23	14.2	25
	1926	1,022	272,767	289,627	6,103	6,329	59.9	396,624	165,221	136	23	14.5	28
Chi., Burl. & Quincy	1927	9,336	1,424,717	1,473,690	53,979	42,343	60.7	2,624,511	1,202,124	739	245	24.9	36
	1926	9,349	1,386,221	1,430,279	51,103	40,586	63.2	2,389,508	1,079,493	808	196	19.5	52
Chi., Rock I. & Pacific	1927	7,562	1,280,622	1,323,910	14,522	31,971	62.3	1,838,594	708,289	546	138	20.1	50
	1926	7,564	1,234,206	1,267,231	14,851	30,400	64.1	1,698,209	651,529	539	159	22.8	46
Denver & R. G. Wn.	1927	2,536	192,781	228,217	41,396	5,550	69.2	328,347	156,095	226	42	15.7	50
	1926	2,548	198,803	238,037	45,996	5,407	66.1	317,700	141,907	224	49	17.8	48
Oregon Short Line	1927	2,537	247,610	269,105	28,785	7,288	68.8	434,489	195,795	186	20	9.7	50
	1926	2,490	284,223	296,759	19,525	7,467	65.2	453,418	196,822	193	25	11.4	58
Sou. Pac.—Pac. Lines	1927	8,723	1,242,229	1,353,073	198,681	37,950	65.7	2,261,659	873,771	674	249	27.0	99
	1926	8,555	1,241,884	1,361,694	213,187	36,920	65.4	2,203,331	857,035	698	211	23.2	69
Union Pacific	1927	3,714	710,861	728,470	32,382	27,528	75.0	1,429,829	592,100	477	39	7.5	211
	1926	3,691	735,433	756,484	39,064	28,118	75.0	1,468,562	622,447	484	59	10.9	200
Southwestern Region:													
Gulf, Colo. & S. Fe	1927	1,933	403,449	435,898	11,094	11,314	59.6	738,877	325,829	152	25	14.1	7
	1926	1,897	240,292	247,157	4,177	7,150	64.3	426,699	184,817	117	21	15.4	23
Mo.-Kans.-Tex.	1927	1,787	240,668	241,948	6,123	8,333	59.7	495,155	187,737	102	28	21.2	35
	1926	1,787	214,650	214,935	3,914	7,441	60.4	429,598	162,836	112	19	14.5	43
Mo.-Kans.-Tex. of Tex.	1927	1,389	162,734	165,935	2,712	4,643	60.8	268,496	107,925	111	24	17.6	51
	1926	1,389	163,400	172,275	2,449	4,350	61.2	250,691	97,529	120	26	17.5	51
Missouri Pac.	1927	7,311	1,273,453	1,307,464	41,660	36,511	62.7	2,209,417	932,842	541	79	12.8	3
	1926	7,310	1,269,809	1,298,923	38,169	36,370	65.5	2,095,293	892,721	534	81	13.2	5
St. Louis-San Francisco	1927	4,860	743,867	760,005	9,320	17,907	63.1	1,056,035	442,851	424	62	12.7	74
	1926	4,895	797,678	817,860	12,811	17,750	61.6	1,041,734	421,246	437	74	14.5	55
Southern Pacific Lines (in Tex. and La.)[1]	1927	4,525	624,962	627,657	1,324	13,808	66.8	805,599	341,281	252	61	19.6	33
	1926	4,435	620,724	621,583	2,754	14,043	65.1	795,745	324,806	253	75	22.7	32
Texas & Pacific	1927	1,954	349,382	349,382	939	9,332	60.1	563,654	202,242	154	33	17.6	15
	1926	1,953	281,067	281,067	1,173	7,620	63.6	435,292	163,702	151	27	15.2	15

[1]Includes Franklin & Abbeville, Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R. R. & S. S. Co., and Texas & New Orleans.

Compared with Feb., 1926, for Roads with Annual Operating Revenues Above $25,000,000

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotive and tender	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
New England Region:													
Boston & Albany	1927 2,733	5,176	7,909	3.1	15,159	1,106	424	20.0	406	30.3	7,881	204	70.1
	1926 2,071	5,203	7,274	3.4	12,347	934	367	19.4	415	29.4	7,414	229	78.1
Boston & Maine	1927 13,138	12,267	25,405	6.4	14,036	1,273	498	20.0	314	22.6	3,820	143	54.7
	1926 12,398	16,170	28,568	8.1	12,017	1,148	470	19.4	264	17.8	3,352	178	48.1
N. Y., New H. & Hartf.	1927 19,814	18,481	38,295	17.7	17,041	1,383	553	20.7	239	16.9	4,857	135	54.6
	1926 16,791	22,901	39,692	13.9	13,841	1,269	513	19.5	194	13.6	4,076	163	53.8
Great Lakes Region:													
Delaware & Hudson	1927 9,927	6,198	16,125	4.0	21,542	1,789	865	31.7	634	32.6	11,682	169	62.9
	1926 11,872	6,662	18,534	3.9	18,669	1,594	774	29.1	471	24.5	9,970	184	59.9
Del., Lack. & Western	1927 17,218	7,446	24,664	3.5	21,608	1,760	756	24.2	556	33.8	13,712	151	71.7
	1926 18,465	9,146	27,611	3.5	18,961	1,575	640	21.0	377	25.2	10,487	191	62.3
Erie (inc. Chi. & Erie)	1927 34,689	22,299	56,988	8.1	24,712	2,149	939	27.0	563	32.5	13,845	138	64.2
	1926 35,831	21,439	57,270	7.6	22,958	2,015	877	26.3	495	29.5	12,201	142	55.9
Lehigh Valley	1927 23,375	9,844	33,219	8.1	23,879	1,748	748	25.3	429	27.0	10,582	168	51.7
	1926 22,019	11,095	33,114	6.6	21,691	1,628	695	23.5	367	22.9	9,033	177	43.9
Michigan Central	1927 18,029	20,080	38,109	3.4	26,552	1,846	664	20.1	335	27.3	7,027	125	66.1
	1926 14,938	19,572	34,510	4.6	26,089	1,789	636	18.7	362	29.8	6,802	128	62.7
New York Central	1927 71,277	72,716	143,993	3.1	27,592	2,314	1,026	28.1	518	30.2	11,516	123	62.6
	1926 62,170	73,406	135,576	4.4	24,147	2,081	910	26.8	510	30.6	10,662	141	64.8
New York, Chi. & St. L.	1927 13,257	10,522	23,779	5.6	23,849	1,770	686	21.9	621	44.7	8,876	117	74.9
	1926 13,231	10,283	23,514	5.1	21,993	1,644	656	21.6	607	41.9	8,574	129	71.3
Pere Marquette	1927 10,094	8,697	18,791	3.8	18,685	1,538	657	26.0	525	32.9	4,524	117	71.7
	1926 9,251	9,653	18,904	4.4	16,844	1,456	614	24.5	457	29.3	3,934	126	67.1
Pitts. & Lake Erie	1927 12,989	8,658	21,647	4.4	28,841	2,765	1,549	45.4	330	12.4	30,890	113	68.8
	1926 10,896	8,530	19,426	7.7	25,142	2,529	1,382	42.5	352	14.1	29,556	80	64.5
Wabash	1927 15,005	12,934	27,939	2.4	25,156	1,694	643	21.9	600	43.5	6,716	142	73.9
	1926 13,265	11,641	24,906	2.4	24,007	1,658	654	21.5	633	43.8	6,315	147	68.5
Central Eastern Region:													
Baltimore & Ohio	1927 68,865	32,927	101,792	4.5	19,817	1,927	916	32.6	598	30.9	11,670	175	69.5
	1926 63,814	38,878	102,692	5.5	17,800	1,841	893	31.8	585	29.3	11,561	188	72.1
Central of New Jersey	1927 18,936	12,548	31,484	4.5	17,562	1,830	871	32.2	238	12.8	10,838	174	46.0
	1926 16,367	15,136	31,503	2.8	14,650	1,616	765	31.4	221	11.3	10,066	193	42.6
Chicago & Eastern Ill.	1927 12,925	4,977	17,902	24.4	22,032	1,705	820	32.2	497	25.7	9,411	145	71.9
	1926 13,862	4,895	18,757	18.5	21,878	1,644	766	28.5	373	20.9	7,396	151	59.9
Clev., Cin., Chi. & St. L.	1927 17,423	20,418	37,841	4.7	25,598	2,067	977	32.3	698	36.2	11,130	129	66.8
	1926 18,009	20,631	38,640	4.1	23,728	1,949	912	30.3	593	31.7	9,659	139	64.4
Elgin, Joliet & Eastern	1927 8,990	7,550	16,540	5.2	15,069	2,231	1,157	41.4	356	14.3	12,772	142	60.6
	1926 9,714	7,562	17,276	5.5	14,568	2,173	1,123	39.0	292	11.9	10,972	153	52.2
Long Island	1927 1,718	4,997	6,715	1.4	4,622	832	313	24.8	65	4.8	1,118	356	36.2
	1926 1,898	6,158	8,056	1.0	4,284	767	306	25.9	53	3.5	1,080	385	40.2
Pennsylvania System	1927 215,944	77,491	293,435	4.7	20,687	1,883	880	31.6	483	24.7	13,068	142	57.8
	1926 206,987	96,977	303,964	9.5	17,690	1,775	852	31.7	488	23.9	13,622	156	64.0
Reading	1927 26,462	15,731	42,193	2.7	20,676	1,878	948	37.3	518	24.4	19,332	160	70.0
	1926 18,970	20,053	39,023	2.9	21,702	1,789	926	37.2	594	26.8	20,518	172	70.7
Pocahontas Region:													
Chesapeake & Ohio	1927 30,356	11,983	42,339	3.3	28,789	2,638	1,407	44.4	1,372	56.8	21,906	103	72.3
	1926 29,846	12,673	42,519	3.3	24,836	2,387	1,299	43.1	1,281	51.9	20,683	118	77.5
Norfolk & Western	1927 28,007	8,452	36,459	1.6	36,351	2,881	1,539	44.8	1,225	47.0	20,014	144	61.0
	1926 27,942	9,735	37,677	2.4	33,692	2,659	1,447	45.0	1,195	44.4	20,180	160	64.0
Southern Region:													
Atlantic Coast Line	1927 23,746	13,040	36,786	3.0	19,117	1,512	559	21.4	424	33.9	3,118	116	59.5
	1926 22,446	24,552	46,998	2.9	15,416	1,393	541	22.2	366	27.1	3,493	137	71.8
Central of Georgia	1927 5,285	5,648	10,933	3.2	19,133	1,362	599	23.9	550	32.6	3,170	137	63.6
	1926 4,326	7,879	12,205	3.5	16,006	1,238	568	25.3	555	30.7	3,553	158	68.1
I. C. (inc. Y. & M. V.)	1927 42,606	25,734	68,340	4.7	22,851	1,803	799	29.3	778	42.9	8,114	137	76.0
	1926 41,982	24,595	66,577	4.1	21,615	1,712	757	27.4	736	41.3	7,479	145	73.7
Louisville & Nashville	1927 44,425	19,331	63,756	8.8	16,008	1,416	680	33.7	636	32.4	8,043	162	90.0
	1926 43,609	24,125	67,734	6.8	13,661	1,311	646	33.0	603	29.6	8,137	183	98.4
Seaboard Air Line	1927 15,830	11,134	26,964	4.0	17,121	1,477	595	23.5	456	30.7	2,901	142	74.8
	1926 12,306	18,732	31,038	1.4	14,653	1,404	573	22.9	391	25.7	3,109	154	74.3
Southern Railway System	1927 58,278	27,591	85,869	6.0	18,955	1,430	585	23.6	473	31.7	5,059	157	57.5
	1926 54,040	33,614	87,654	4.8	16,534	1,341	559	23.7	484	31.4	5,273	173	66.8
Northwestern Region:													
Chi. & North Western	1927 47,998	28,232	76,230	6.8	17,569	1,420	551	23.5	365	25.2	3,291	147	59.3
	1926 48,164	27,173	75,337	6.7	16,259	1,344	547	23.5	347	23.3	3,085	155	53.3
Chi., Milw. & St. P.	1927 54,330	22,932	77,262	5.3	20,381	1,658	717	25.7	493	30.3	3,400	151	60.2
	1926 54,938	20,364	75,302	5.8	19,785	1,615	703	24.7	472	29.1	3,172	155	52.3
Chi., St. P., Minn. & Om.	1927 3,164	8,965	12,129	13.6	13,707	1,133	478	23.7	419	27.0	2,946	151	61.8
	1926 3,197	8,698	11,895	11.7	12,899	1,070	442	22.7	387	26.0	2,529	170	57.5
Great Northern	1927 41,744	10,055	51,799	6.6	20,716	1,810	822	26.0	382	21.6	2,421	154	36.8
	1926 43,281	9,513	52,794	7.9	21,208	1,840	806	25.0	362	21.8	2,323	152	34.3
M., St. P. & S. Ste. M.	1927 19,545	5,704	25,249	4.1	14,556	1,272	567	24.2	384	23.5	2,219	131	53.7
	1926 18,572	5,782	24,354	4.8	13,763	1,219	540	23.0	385	24.3	2,146	131	52.6
Northern Pacific	1927 38,145	7,256	45,401	6.9	21,660	1,720	799	25.0	433	23.5	3,022	153	42.9
	1926 35,197	7,039	42,236	6.9	22,382	1,766	817	25.5	505	27.5	3,278	154	43.8
Oreg.-Wash. R. R. & Nav.	1927 7,223	3,563	10,786	3.7	19,821	1,659	774	26.5	431	22.3	2,146	183	42.3
	1926 6,810	3,326	10,136	6.1	19,734	1,676	747	24.9	429	24.4	1,990	182	41.1
Central Western Region:													
Atch. Top. & S. Fe. incl. P. & S. F.)	1927 56,744	19,966	76,710	6.2	25,284	1,826	714	23.4	518	34.8	3,835	125	68.5
	1926 55,217	14,604	69,821	7.6	24,480	1,742	661	22.2	456	32.1	3,142	129	56.2
Chicago & Alton	1927 9,942	5,250	15,192	3.6	18,889	1,530	619	27.2	428	28.3	6,368	160	71.8
	1926 9,899	4,146	14,045	6.5	17,906	1,454	606	26.1	420	26.9	5,774	172	66.4
Chi., Burl. & Quincy	1927 49,192	18,110	67,302	4.4	23,989	1,842	844	28.4	638	37.0	4,599	143	55.5
	1926 50,217	16,527	66,744	5.8	22,506	1,724	779	26.6	578	34.4	4,124	152	52.7
Chi., Rock I. & Pacific	1927 33,174	20,433	53,607	8.0	18,050	1,436	553	22.2	472	34.2	3,345	158	69.9
	1926 34,063	18,503	52,566	11.0	17,702	1,376	528	21.4	443	32.2	3,076	164	65.6
Denver & R. G. Wn.	1927 11,134	3,374	14,508	2.3	17,595	1,703	810	28.1	384	19.8	2,198	194	35.9
	1926 11,159	3,698	14,857	3.4	16,755	1,598	714	26.2	341	19.7	1,989	206	37.2
Oregon Short Line	1927 8,249	6,813	15,062	3.7	23,785	1,755	791	26.9	464	25.1	2,756	134	51.7
	1926 8,018	4,087	12,105	5.4	22,161	1,595	692	26.4	581	33.8	2,823	145	51.9
Sou. Pac.—Pac. Lines	1927 33,725	24,899	58,624	5.5	22,840	1,821	703	23.0	532	35.2	3,577	132	60.1
	1926 31,939	25,746	57,685	6.6	21,565	1,774	690	23.2	531	35.0	3,578	136	61.9
Union Pacific	1927 21,522	9,156	30,678	12.3	33,229	2,011	833	21.5	689	42.7	5,693	118	52.7
	1926 17,907	8,715	26,622	11.4	31,363	1,997	846	22.1	835	50.3	6,023	126	52.3
Southwestern Region:													
Gulf, Colo. & S. Fe	1927 10,417	7,631	18,048	2.8	23,767	1,831	808	28.8	645	37.6	6,020	119	90.2
	1926 11,531	4,184	15,715	2.9	24,602	1,776	769	25.9	420	25.3	3,479	115	65.1
Mo.-Kans.-Tex.	1927 8,592	4,215	12,807	5.4	28,246	2,057	780	22.5	524	38.9	3,752	105	68.4
	1926 8,896	3,839	12,735	4.1	27,095	2,001	759	21.9	457	34.6	3,254	108	59.6
Mo.-Kans.-Tex. of Tex.	1927 240	9,798	10,038	9.2	21,168	1,650	632	22.2	366	27.2	2,645	114	44.8
	1926 331	9,841	10,172	9.0	19,982	1,534	597	22.4	342	24.9	2,507	122	42.8
Missouri Pac.	1927 28,211	19,455	47,666	5.0	22,191	1,735	733	25.5	699	43.6	4,557	131	77.7
	1926 28,352	21,592	49,944	6.3	20,557	1,650	703	24.5	638	39.7	4,375	139	77.6
St. Louis-San Francisco	1927 21,084	10,588	31,672	3.9	18,223	1,420	595	24.7	499	32.0	3,255	166	56.5
	1926 19,228	12,268	31,496	5.0	17,114	1,306	528	23.7	478	32.7	3,073	167	58.1
Southern Pacific Lines (in Tex. and La.)[1]	1927 11,864	14,754	26,618	5.5	17,768	1,289	546	24.7	458	27.7	2,694	109	71.7
	1926 11,752	16,191	27,943	8.4	17,286	1,282	523	23.1	415	27.6	2,616	121	68.1
Texas & Pacific	1927 6,330	6,696	13,016	6.1	21,715	1,613	579	21.7	555	42.6	3,696	113	67.0
	1926 6,801	6,373	13,174	3.1	19,312	1,549	582	21.5	444	32.5	2,993	115	56.5

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Traffic

The Transportation Club of San Francisco has elected as president for the ensuing year N. K. Lockwood; first vice-president, Wilmer Sieg; second vice-president, A. L. Baker; secretary, W. J. Martindale.

The Boston & Maine, announcing its new time table for April 24, says that 14 new passenger trains are to be put on between Boston and Haverhill, Lowell, Portsmouth (N. H.), and other points within 50 miles of Boston; all of them established as frankly experimental. Notwithstanding a recent renewed decline of passenger revenue, the company has decided to take this method of bidding for more business. The continuance of the trains, therefore, will depend upon the amount of patronage that they get. There is also to be a new train from Portland, Me., to Boston, in the afternoon, one train between these cities in the forenoon being taken off. A number of trains are to be made faster.

The Interstate Commerce Commission on April 20 made public a decision on a complaint filed by the Southwestern Millers' League et al., finding that the proportional rates on wheat flour in carloads from Missouri river points, when from beyond, to points in Indiana, Ohio, Pennsylvania, West Virginia and Kentucky are unduly prejudicial to the extent that they exceed the proportional rates contemporaneously maintained on the same commodities from Minneapolis, Minn., and points taking the same rates to the same destinations. The commission says that in removing the undue prejudice the eastern carriers will be expected to have an important part, and that in the establishment of rates in compliance with its findings such readjustments should be made in rates to the territory adjacent to the destination territory considered as are necessary to harmonize the entire adjustment.

Strong criticism of the Dominion Railway Board with statements that it was rapidly losing public confidence and that a new chairman should be appointed marked a debate in the House at Ottawa last week when the question of the movement of Alberta coal to Ontario was raised by E. J. Garland, one of the Alberta Progressives. A year ago instructions were given by the government to the Railway Board to make an early inquiry into the cost to the railways of handling this coal at what would be regarded as an economic figure for the coal dealer in Ontario. The general rates equalization case before the Board had intervened and is still proceeding, and the chairman of the Board, H. A. McKeown, contends that it is not the Board but the prolongation of evidence and argument by Western lawyers on the equalization case that is responsible for delay. Hugh Guthrie, leader of the Conservatives in the House, even urged a reconstitution of the Board

Freight Claims Adjusted Promptly

Claims for lost and damaged freight are being adjusted by the railroads with the best promptness ever achieved. The Freight Claim Division, A. R. A., reports that the number of claims unsettled at the close of the month has reached the point where freight claim offices are operating on a current basis.

According to the reports, 71.9 per cent of the claims filed in 1926 were adjusted within 30 days, and 90 per cent within 90 days, the best record since the compilation of these figures was started (in 1921).

There were 2,491,856 loss and damage claims filed in 1926. While this was an increase of 4.7 per cent over the number filed in 1925, there was an increase of more than seven per cent in the volume of freight moved. On January 1, 1927, the railroads had 21,600 fewer unsettled freight claims pending than on the same date the year before.

Commission's Control of Rail-and-Water Traffic

The decision of the Supreme Court of the United States on April 11 sustaining an order of the Interstate Commerce Commission, regulating freight rates on cotton from Oklahoma to New England, by boat from Galveston (noticed in *Railway Age*, April 16, p. 1216), says that it was the intention of Congress as shown by various provisions of the Interstate Commerce act and the Transportation act "to broaden the control of the Interstate Commerce Commission over rail-and-water transportation and, generally, to extend the regulatory power of that body over all such transportation, in the public interest." The suit was that of the Chicago, Rock Island & Pacific versus United States, and the opinion was by Mr. Justice Sutherland. The decision affirmed the decree of the Federal District Court of Northern Texas, 6 Fed. 888, sustaining I. C. C. order 87, I. C. C. 392 and I. C. C. 93-268, prescribing rail-and-water rates on cotton from points in Oklahoma, via Galveston, and certain steamship lines thence to New England destinations.

Losses of Freight by Theft Reduced

Records of total payments by the railroads of the United States and Canada for loss of and damage to freight in the year 1926, as reported in the *Railway Age* of April 16, page 1197, show a decrease as compared with 1925 of $584,782. Of this total decrease, no less than 30 per cent—$177,942—is credited to the item of losses by theft. Robberies during the year under review amounted to $1,314,501, the smallest total for any year since 1920, according to reports compiled by the Protective Section of the American Railway Association. This total is nearly 12 per cent below that for 1925, and is a reduction of $11,412,446 below the losses for 1920.

Claims paid in 1926 due to loss of entire packages as a result of robbery amounted to $738,940, a decrease of $99,471 compared with 1925. Losses due to other thefts amounted to $575,561, a decrease of $78,479.

Freight-Rate Hearings in Western Cities

A tentative program of hearings before Commissioner Frank McManamy and Assistant Chief Examiner W. H. Wagner of the Interstate Commerce Commission on the application of western carriers for a readjustment of class freight rates was announced at the hearing at Kansas City, Mo., on April 17. Following this hearing, which began April 7 and which is expected to last two weeks longer, a

104 Refrigerator Cars of Tomatoes on the F. E. C.

"The East Coast Dispatch," with a schedule of 18 hours 3 min. from Hialeah to Jacksonville. The train shown in the photograph improved this schedule by 25 min.

two-weeks' recess will be taken, after which proceedings will open at Fargo, N. D., and then at Sioux Falls, S. D., Omaha, Neb., Lincoln, Neb., and Denver, Colo. After another two weeks' recess the hearings will be resumed at Minneapolis, Minn., and St. Paul, and following still another recess further testimony will be heard in Chicago.

R. C. Fyfe, chairman of the Western Classification committee, testified that at present there is an overlapping and conflicting relationship of class rates between various territories. This relationship cannot be made equal until there is a readjustment of all the classes. He said that each rate-making territory now has a variable number of classes. If there were the same number of classes in each territory, uniform rates could be established, eliminating numerous territorial controversies. Following Mr. Fyfe's testimony, E. B. Boyd, chairman of the Western Trunk Line Committee; W. G. Bierd, receiver of the Chicago & Alton, and J. G. Morrison, general freight agent of the Northern Pacific, were cross-examined on testimony they had given at Omaha several weeks ago.

The carriers completed their case on April 18, following the testimony of L. E. Wettling, statistician for the Western Carriers; H. A. Triebel, chief of Tariff Bureau of the Rock Island; G. A. Hoffelder of the Burlington, A. W. Towsley of the Rock Island and L. T. Wilcox, Union Pacific. Evidence is being presented by public service commissioners of 11 states, including Missouri, Kansas, Nebraska, Minnesota, North and South Dakota, Colorado, Wisconsin, Illinois, Wyoming and Iowa.

J. H. Tedrow, transportation commissioner of the Kansas City Chamber of Commerce, made the opening statement for Kansas City, St. Joseph and Atchison. He offered 56 exhibits of rates and routes on which the shippers base their case.

Commissioner McManamy, on April 19, appointed a committee consisting of Luther M. Walters of Chicago, attorney for ten upper Mississippi River cities; E. B. Boyd, chairman of the Western classification committee; W. T. Hughes, general attorney of the Rock Island, and P. H. Porter, counsel for the Wisconsin Railroad; commission to study the proposal that there be made a more equitable division of rates between Eastern and Western roads as a means of eliminating the depression of which the Western roads complain.

Spirited Debate on Maritime Rate Reduction Bill

A sharp debate arose in the Canadian House of Commons last week when a motion was made for second reading of the bill to provide for a 20 per cent reduction in freight tolls on railways in the Maritime provinces. The measure is supported both by Liberals and Conservatives, both having representation in those provinces, but it is vigorously opposed by certain Western members, notably the Alberta Progressives who claim that while they have no objection to a reduction in the long haul eastbound they object to a reduction in the domestic rates in those provinces and to the request that the federal treasury foot the bill.

It is provided in the measure that the federal government reimburse the Canadian National and all other railways operating in the Maritime provinces affected by the freight rate reduction. On Monday of this week the Minister of Railways and Canals said that the cost to the Canadian National would be $2,000,000, to the Canadian Pacific Railway $500,000 and to the other smaller railways a lesser amount. Dealing with this question of reimbursement Mr. Dunning, the Railways Minister, said:

"In section 6 we are dealing with railways owned by the government of Canada, in which the government is the shareholder and upon which we are now meeting the deficits. In connection with these lines—and be it remembered that we expect these lines will, as the figures which I gave a little while ago will demonstrate, carry most of the traffic affected by this legislation in the proportion of at least four to one as compared with the other lines—we are proposing to set up separate accounting for the lines covered by this measure and to come to parliament each year with a separate item in the railway budget for the deficit on these lines. I want to say to my honorable friends in that corner who are disposed to be critical of this whole bill, that the deficit figure which will be brought forward in the next railway budget will include not only that portion of the deficit due to the operation of this legislation but the general deficit upon eastern lines. It must in the nature of things. I attempted to work out a scheme whereby we would keep the deficit due to this 20 per cent separate from the ordinary operating deficit on the eastern lines, but it was too complicated to be worth while. Consequently the provision in clause six is being put before the House: that is, with respect to Canadian National lines there will be each year in the railway budget a separate item covering the deficit on eastern lines, but without in any way otherwise affecting management or operation of the eastern lines."

Mr. Gardiner: "At this point could the minister give the committee any indication as to the present deficit on those same lines?"

Mr. Dunning: "The operating deficit on the Atlantic division from Rivière du Loup, which is the present terminus, was in 1926, $4,777,000. My honorable friends must understand that I am speaking from memory, but I think the figure is practically accurate."

After considerable debate the bill was given second reading and will be given final passage before the end of the week. It developed into a fight between East and West. The East argued that as it in 1923 voted for the Crow's Nest Pass rate legislation to help the Western people the latter should now support the Maritimes. The West argued that it had no debt of gratitude as anything it received from Parliament it paid for, and then declared that federal subsidies to the railways to reduce freight rates was unsound economic practice.

Foreign

Increased Freight Traffic in Russia

Freight handled on the railways of the Russian Soviet Union during the first four months of the current fiscal year, October 1 to February 1, was 43,487,000 metric tons, as compared with 38,680,000 metric tons for the same period last year, an increase of 12.4 per cent, according to the Soviet Union Information Bureau, Washington, D. C. Average daily freight-car loadings during the period were 26,862, as compared with 23,670 last year, an increase of 13.4 per cent. Railway revenues for the period were $251,835,000 as compared with $209,347,500 last year.

Japan Orders Rails from France

Two large Japanese orders for rails have recently been placed in France, according to advices to the Department of Commerce from the office of the commercial attaché, at Paris.

The first of these was for 30 miles of 100 lb. rails for the South Manchuria Railway. This order was placed with the firm of De Wendel et Cie., through the intermediary of the Mitsubushi Shoji Kaisha. Another order for 8,226 tons of 100 lb. rails for the Imperial State Railways was given to Mitsui & Company, who were acting on behalf of a French company.

Exports of steel rails from France increased considerably during the first two months of 1926, when they amounted to 60,366 tons, as compared with 41,657 tons exported in the corresponding period of 1926. Great Britain was the principal destination of those exports, with purchases aggregating 10,079 tons; Switzerland was second with receipts of 7,725 tons; Italy took 6,179 tons; Belgium-Luxemburg, 4,786 tons; French West Africa, 3,878 tons and Brazil, 3,793 tons.

Russian Railway's Progress

The Turkestan-Siberian Railway to be built by the Russian government will be 1,056 miles long and is estimated to cost $83,430,000 and, when completed, will provide transportation to over 1,455,000 people covering 422,500 square miles, according to the American-Russian Chamber of Commerce. Location and construction work will commence this spring on the south end and the entire line will be completed in 1931. A total of 620 miles of new railway lines will be built this season.

The following are the results of operation of railways in the U. S. S. R. during the past fiscal year:

Total freight hauled....	129,684,355	short tons
Ton, miles	40,515,000,000	
Av. daily car loading..	27,000	
Av. train load, net....	447	tons
Av. daily freight car mileage	45.5	
Total passengers carried	262,663,000	
Av. trip each.....	55.7	miles
Increase over 1924-5....	40	per cent

Coal constituted 19 per cent of the total freight hauled, grain 12.1 per cent,

petroleum 4.6 per cent, wood for fuel 10.5 per cent. and lumber 11.1 per cent.

A number of new passenger cars to be used on the Moscow-Vladivostok line have just been completed in the Proletariat Car Works in Leningrad. This factory has also handled capital repairs on all locomotives used on the lines out of Leningrad and will now commence on other locomotive "boneyards."

The gross railway receipts were $67,156,000 for December, which is an increase of 4.6 per cent over November and 26.6 per cent increase over December, 1926.

New Sleeping Cars for European Railways

Improvement of the first-class sleeping car accommodation on European railroads is being continued by the Compagnie Internationale des Wagons-Lits et des Grands Express European, according to advices to the Department of Commerce from Trade Commissioner H. H. Kelly, Paris.

New sleeping cars of modern type have just been added to the trains on the Paris-Geneva and Berlin-Vintimille runs. They contain eight single compartments and four double compartments with private or connecting lavatories. The cars are similar to those already running on such de luxe international trains as the Nord-Express, the Orient-Express, and the Calais-Mediterranean-Express.

A de Luxe European Sleeping Car

Interior View of Compartment

On European trains, sleeping accommodations are open only to first-class passengers, and the rates are almost as high as the train-fare in many cases.

New Train Ferries for Germany

A number of up-to-date vessels have been placed in service by the German State Railway Company for the ferry traffic between Germany, Denmark and Sweden, the newest being the ocean-going ferry steamer Schwerin. This vessel has a displacement of 3,600 tons when fully loaded; her length is 600 meters and breadth about 18 meters. The hull is divided by bulkheads into eleven watertight compartments and is provided with rolling tanks to reduce the pitching and rolling motion when under way. Bow and stern are armored for resisting ice. The ship will be driven by two reciprocating steam engines of an aggregate of 4,500 horsepower, and the four boilers are constructed for oil-firing. The speed is about 16 knots.

The Schwerin is provided with a bow rudder in addition to the stem rudder, for safe steering in the ferry ports. Both rudders are maneuvered electrically from the bridge. The carriage deck of the Schwerin has rails on either side of the engine shaft, running the whole length of the vessel, and capable of taking seven four-axled passenger (D-Zug) cars or 18 two-axled freight cars. The cars are entirely under cover and are firmly lashed so as to prevent all movement even in the heaviest seas. This is done by means of hinged eye-bolts built into the deck, to which the couplings can be attached. The cars are also secured in a transverse direction by bolts.

Equipment and Supplies

Freight Cars

THE LEHIGH & NEW ENGLAND is inquiring for 200 box cars of 50 tons' capacity.

THE CHICAGO, NORTH SHORE & MILWAUKEE has ordered 10 flat cars from the Standard Steel Car Company.

THE CHICAGO, SOUTH SHORE & SOUTH BEND has ordered six flat cars from the Standard Steel Car Company.

THE CHILEAN GOVERNMENT Railways are inquiring for from 50 to 150 gondola cars from car builders in this country.

THE SOUTH MANCHURIA RAILWAY has ordered 20 air dump cars of 45 cu. yd. capacity from the Magor Car Corporation.

THE CORNWALL has ordered 20 ore cars of 70 tons' capacity from the Bethlehem Steel Company. Inquiry for 15 cars was reported in the *Railway Age* of March 19.

THE ST. LOUIS SOUTHWESTERN has ordered 30 caboose car underframes from the Virginia Bridge & Iron Company. Inquiry for these underframes was reported in the *Railway Age* of March 19.

THE SOUTHERN has ordered 10 air-dump cars, drop-door type, of 30 cu. yd. capacity and 10 of 20 cu. yd. capacity from the Pressed Steel Car Company, to be built at its Koppel plant. Inquiry for this equipment was reported in the *Railway Age* of April 2.

THE UNION TANK CAR COMPANY has ordered 300 tank cars from the American Car & Foundry Company and 200 from the General American Car Company, all of 8,000-gal. capacity. Inquiry for this equipment was reported in the *Railway Age* of April 2.

THE PERE MARQUETTE has ordered 1,000 box cars from the Pressed Steel Car Company, 250 gondola cars from the Illinois Car & Manufacturing Company and 250 hopper cars from the Standard Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of March 26.

Passenger Cars

THE SOUTHERN PACIFIC has ordered six dining cars from the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in the *Railway Age* of February 26.

Machinery and Tools

THE UNION PACIFIC has ordered two one-yard dragline crawler cranes from the Osgood Company.

THE MONONGAHELA has ordered a 26-in. valve seat rotary planer, from the Niles-Bement-Pond Company.

THE PULLMAN CAR & MANUFACTURING CORPORATION has ordered a 53-in. vertical boring mill, from the Niles-Bement-Pond Company.

THE NEW YORK RAPID TRANSIT COMPANY has ordered a 20-in. shaper and a 36-in. throat single punch, from the Niles-Bement-Pond Company.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is inquiring for two 15-ton and one 200-ton electric locomotive cranes. An order for a 16-in. Pratt & Whitney lathe has been given to the Niles-Bement-Pond Company.

THE MISSOURI-KANSAS-TEXAS is inquiring for 65 machine tools, including the following:

1 24-in. all-geared self-oiling drill press.
1 15-in. vertical pattern drill press.
1 14-in. sensitive floor drill.
1 internal grinder for all sizes of locomotive air compressors.
2 grinders complete with all attachments, including link grinding.
2 emery grinders, 3-in. by 18-in. grinding wheels.
2 ball bearing double floor grinders, 12-in. by 2-in. wheels.
1 floor grinder, 12-in. by 2-in. wheels.
1 floor grinder.
1 frame jaw miller.
1 locomotive frame jaw grinder.
5 frame jaw grinders.
1 heavy-duty face grinder.
1 heavy-duty guide bar and face grinder having 36-in. table and 32-in. grinding wheel.
2 heavy-duty car wheel boring machines, capacity up to 36-in. tread diameter.
1 horizontal boring, drilling and milling machine with 4-in. diameter spindle.
1 42-in. boring mill.
1 44-in. heavy-duty driving-box boring and facing mill.
1 milling machine, longitudinal table travel 72-in.
3 100-ton motor-driven vertical hydraulic driving box presses.
1 100-ton hydraulic bushing press.
1 car wheel press, 400-ton capacity, 48-in.
1 engine lathe, 18-in. by 10-ft., complete with all regular equipment.
1 24-in. by 5-ft. engine lathe.
1 36-in. by 7-ft. engine lathe.
1 48-in. by 8-ft. 6-in. heavy-duty lathe.
1 heavy-duty double-head locomotive driving wheel lathe, 90-in.
1 extra heavy-duty, car wheel lathe for turning solid rolled steel or steel tired coach, tender and engine truck wheels 26-in. to 42-in. tread diameter.
1 heavy-duty double-axle lathe to swing over bed 30½ in.
1 center drive journal turning and axle lathe, swing in gap 45 in.
1 24-in. heavy-duty vertical turret lathe.
1 universal brass lathe, 20 in., with geared headstock.
1 90-in. journal turning and quartering machine.
1 journal turning and quartering machine, 90 in., complete with all equipment.
2 32-in. extra heavy crank shapers.
1 1½-in. high-duty heading and forging machine.
1 mechanical sledge.
1 6-ft. heavy-duty radial drill.
1 28-in. geared upright drill.
1 drill pointer.
1 drill pointer having capacity of ½-in. to 3-in. drills.
1 combination drill and reamer grinder, for drills up to 1½-in. diameter and reamers up to 24-in. long.
1 cutter and tool grinder, minimum table travel 24 in.
1 universal cutter and tool grinder.
2 portable service grinders, 3,500 r.p.m.
1 horizontal feed center grinder, 3,500 r.p.m.
1 electric piston grinder.

Signaling

THE DELAWARE & HUDSON has ordered from the General Railway Signal Company, material for an interlocking plant at Cooperville, N. Y.

THE CANADIAN PACIFIC has ordered from the Union Switch & Signal Company an interlocking for Lennoxville, Que.; 24 mechanical levers and two electric.

Supply Trade

The **Southern Wheel Company** has removed its general offices from Pittsburgh, Pa., to 3002 Grand Central Terminal, New York City.

J. P. Armstrong, with office in the Balboa building, San Francisco, Cal., will in future represent in that district the **Flannery Bolt Company,** Pittsburgh, Pa.

The general offices of the **Universal Pipe & Radiator Company** and its subsidiaries will be removed on May 1 to the Graybar building, 420 Lexington avenue, New York City.

August Ziesing, who has retired as president of the **American Bridge Company,** was born at Peru, Ind., on February 19, 1858 and graduated from the University of Illinois in 1878. Until 1880 he was employed by **M. Lassig** in bridge construction work in Chicago and was later engaged in structural engineering work at Wooster, Ohio, for the Pennsylvania. From 1882 to 1897 he

August Ziesing

was manager and engineer of the Lassig Bridge Works, Chicago, and from the latter date until 1900 he was a consulting engineer, specializing in railway structures. In 1900 he entered the employ of the American Bridge Company as vice-president and western manager, which position he held until September, 1905, when he was elected president.

Blake C. Hooper, secretary-treasurer of the Minnesota Supply Company, St. Paul, Minn., has been appointed manager of railroad sales of the **Baker-Raulang Company,** Cleveland, Ohio.

The **Chambersburg Engineering Company,** Chambersburg, Pa., has opened an office at 613 Machinery Hall, 549 West Washington street, Chicago, under the direction of **D. M. McDowell.**

Alexander Laughlin has been elected chairman of the board of the **Verona Tool Works,** a newly created position, and **W. L. Mellon** has been elected a director to succeed **Alexander Laughlin, Jr.,** deceased.

C. H. White, manager of the New Orleans, La., office of the **Brown Hoisting Machinery Company,** has been transferred to Chicago and will be succeeded by **W. T. Simpson** of the Cleveland, Ohio, office.

The **W. N. Thornburgh Manufacturing Company,** Cicero, Ill., has purchased the dust guard business of the **Lacey Williams Company,** Cleveland, Ohio, and will manufacture this product under its own name.

The **Verona Tool Works,** Pittsburgh, Pa., has moved its general offices to 1704 First National Bank building, Pittsburgh. After May 1, the Chicago office of this company will be located at 607 Railway Exchange building.

H. R. Condon, forester of the Pennsylvania, with headquarters at Philadelphia, Pa., has resigned to become general manager of the **American Mond Nickel Company,** with headquarters at Pittsburgh, Pa., effective May 1.

R. H. Clore has been appointed a representative in the Cincinnati territory of the **United States Electrical Tool Company,** Cincinnati, Ohio, and **Ralph J. Cook** has been appointed a special representative. Mr. Clore was formerly with the National Carbon Company, of Cleveland.

The **Air Reduction Company, Inc.,** New York, has acquired the **Interstate Oxygen Company,** a West Virginia corporation with oxygen plants at Wheeling, W. Va., and Steubenville, Ohio, and Portsmouth, Ohio, and the **Compressed Gas Manufacturing Company,** also a West Virginia corporation, having an acetylene plant at Huntingdon, W. Va.

At a meeting of the board of directors of the **Gould Coupler Company,** on April 7, **G. L. L. Davis** was elected vice-president in charge of sales, with headquarters at 250 Park avenue, New York. For the past 17 years Mr. Davis has been with the Scullin Steel Company, St. Louis, Mo., as vice-president in charge of sales.

T. L. Miller, who has been in charge of the Western office of the **Tuco Products Corporation** at Chicago, has been elected vice-president, with the same headquarters. **C. M. Schramm,** assistant to the vice-president of the Vapor Car Heating Company, Chicago, has been elected vice-president of the Tuco Products Corporation, with headquarters at the same point.

C. R. Naylor has been appointed manager of western sales, with headquarters at Chicago, of the **Gould Car Lighting**

Corporation, to succeed George R. Berger, who has resigned to enter business for himself. The Gould Car Lighting Corporation office has been removed from 32 West Randolph street to 2108 Straus building, Chicago. Mr. Naylor is also manager of western sales, at Chicago, of the **Symington Company** and the **Gould Coupler Company.**

R. L. McLellan, formerly managing director, Compania Westinghouse Electric Internacional S. A. of Argentine Republic, has been appointed general manager of the **Westinghouse Electric International Company,** with headquarters in New York. Mr. McLellan was born in Valparaiso, Ind., in 1886. He was graduated with the degree of electrical engineer from Purdue University in 1907. After leaving school, he was engaged in designing transformers for a period of about a year for the Lafayette Manufacturing Company, Lafayette, Ind., and for two years he was employed by the Fairbanks Morse Electric Manufacturing Company, Indianapolis, Ind., where he served in various capacities in engineering work. In 1910, he was appointed manager of the sales department, Merchants Heat & Light Company, Indianapolis, Ind., and after a year in this service was engaged for

R. L. McLellan

three years by H. M. Byllesby & Company, Chicago, in central station management. In 1914, he was appointed sales manager for the Appalachian Power Company, Bluefield, W. Va., and in 1915, took up work with the railway sales department of the Westinghouse Electric & Manufacturing Company, Chicago, where he was in charge of steam railway sales in the Chicago territory. In 1921, Mr. McLellan was made assistant to F. H. Shepard, director of heavy traction, in which capacity he represented the Westinghouse Company in Europe and South America. In 1924, he was made managing director of the Compania Westinghouse Electric Internacional S. A., which position he held until his present appointment.

The **Continental Steel Corporation** has been organized following the consolidation of the **Superior Sheet Steel Company,** Canton, Ohio, the **Kokomo Steel & Wire Company,** Kokomo, Ind., and the **Chapman-Price Steel Company,** Indianapolis, Ind. **J. E. Frederick,** secretary and general manager of the Kokomo Steel & Wire Company, has been elected chairman of the board of directors of the new company. **Miles Chapman,** president of the Chapman-Price Steel Company, has been elected chairman of the executive committee. **Henry A. Roemer,** president of the Superior Sheet Steel Company, has been elected president. **D. A. Williams,** vice-president and general superintendent of the Superior Company, has been elected vice-president of the new company in charge of all operations. The general office of the corporation will be established at Kokomo.

Correction

Charles R. Long, Jr., is vice-president of the **Okadee Company** instead of president, as shown in the *Railway Age* of April 9. **A. G. Hollingshead** is president of this company.

Locomotive Shipments in March

March shipments of railroad locomotives, from principal manufacturing plants, based on reports received by the Department of Commerce, totaled 137 locomotives, as compared with 80 in February and 162 in March, 1926. The following table gives the shipments and unfilled orders of locomotives for the past three months, compared with last year:

Year and Month	Shipments						Unfilled orders, end of month				
		Domestic		Foreign			Domestic		Foreign		
1926	Total	Steam	Electric	Steam	Electric	Total	Steam	Electric	Steam	Electric	
January	126	91	11	22	2	653	506	53	52	42	
February	163	101	22	38	2	572	442	60	30	40	
March	162	146	11	4	1	780	635	50	54	41	
Total (3 mos.)	451	338	44	64	5	...	...	..	..	..	
1927											
January	57	16	8	31	2	405	334	16	49	6	
February	80	69	10	..	1	396	314	22	51	9	
March	137	84	11	42	..	385	301	48	27	9	
Total (3 mos.)	274	169	29	73	3	...	...	..	..	..	

Obituary

Frederick Weston, of the manufacturing department of the Baldwin Locomotive Works at Philadelphia, Pa., and formerly in charge of its New York office, died in Wynwood near Philadelphia, Pa., on April 17, at the age of 49. Mr. Weston graduated from Yale University with the class of 1900 and had been associated with the Baldwin Locomotive Works since that year.

Leon P. Feustman, for many years vice-president of the Worthington Pump and Machinery Corporation, New York, died on April 7 at his home in New York City, at the age of 66. Mr. Feustman was born in Philadelphia, Pa., on May 6, 1861. He was graduated from the University of Pennsylvania in 1882 with the degree of B.Sc. In 1888, Mr. Feustman went to Mexico for the Consolidated Smelting & Refining Company and later was resident manager of all that company's affairs in Mexico. In 1900 he went to New York to serve in the home office of the company. For the following three years he was closely connected with some of the important Guggenheim enterprises, and left that organization in 1903 to become vice-president of the Power & Mining Machinery Company. Four years later he was elected vice-president and general

L. P. Feustman

manager of the International Steam Pump Company with which the Power & Mining Machinery Company was merged, and which through a reorganization in 1914 became known as the Worthington Pump and Machinery Corporation, Mr. Feustman serving with the latter company as vice-president until he retired a short time before his death.

Trade Publications

ANTI-SLIP TREADS.—The structural features of Feralun anti-slip treads for terminal buildings, stations, car steps, platforms and door saddles are shown in bulletins issued by the American Abrasive Metals Company, 50 Church street, N. Y.

ASH RECLAIMING PLANTS.—The Roberts & Schaefer Company, Chicago, has issued a 12-page bulletin describing and illustrating its "Kolumbus" separator for recovering combustible fuel from ashes by a flotation process. It is said to reclaim from 20 to 30 per cent of unconsumed fuel from the ashes dumped from locomotives or power plants furnaces, and at one plant where a survey was made the savings effected were said to have been over 79 per cent of the cost of the investment after making allowance for operating costs, fixed charges and depreciation.

Construction

ATCHISON, TOPEKA & SANTE FE.—This company and the Kansas Highway Commission have reached an agreement for the elimination of a grade crossing at Zarrah, Kan., by the construction of a viaduct with a clear span over a six-track width. The railroad will bear 25 per cent of the cost.

ATCHISON, TOPEKA & SANTA FE.—This company plans the construction of an earth dam with concrete core wall at Augusta, Kan., to form a reservoir which will have a capacity of 462,000,000 gal. of water. To carry the water from the reservoir, which is located north of Augusta, to the yard and terminal at Augusta it is planned to construct a 12-in. gravity supply line 33,700 ft. long. A pumphouse, treating house and tank, storage tank, service tank and water cranes will be constructed at Augusta yard.

ATLANTIC COAST LINE.—This road is building a new line approximately one and one-half miles long at Conway, S. C., in order that its main tracks may be removed from the principal street in Conway. The change of line involves the building of a new draw-bridge over the Waccamaw river.

CHICAGO, MILWAUKEE & ST. PAUL.—The Federal court at Chicago has authorized the replacement of a bridge over the Grand river at Chillicothe, Mo., to cost about $87,000; the construction of an addition to the power house and machine shop at Channing, Mich., to cost $31,000; and the construction of a spur track and warehouse at Seattle, Wash., to involve an expenditure of about $56,000.

GREAT NORTHERN.—A contract for the construction of a reinforced concrete and steel highway bridge over the right-of-way of this railroad and the Minneapolis & St. Louis at Laurel avenue, Minneapolis, Minn., has been let to the Industrial Contracting Company, Minneapolis, at a cost of about $100,000. This structure will have a total length of 725 ft.

GREAT NORTHERN.—This company has filed with the Interstate Commerce Commission a request as to whether the proposed construction and operation of a relocation of its line between Peshastin and Winston, Wash., 16 miles, and between Berne and Scenic, Wash., 10.29 miles, and the abandonment of the present line between the points named, are such as to require it to first obtain a certificate from the commission. If the commission holds that such certificates are necessary, the company makes application for them, but it expresses the opinion that they are not necessary and expressly reserves the right to question the determination of the commission in any proper manner. The proposed line between Berne and Scenic is via the new tunnel of 7.79 miles through the Cascade mountains and would replace 17.94 miles of the present operated line, while reducing the summit elevation 502 feet and the major portion of 2.2 per cent grade to 1.57 per cent and eliminating about 6 miles of snow sheds. The other line would shorten the distance approximately 1 mile and eliminate trouble from snow slides.

MISSOURI-KANSAS-TEXAS. — The city commission of Dallas, Tex., has granted this company the right to construct an extension into the South Dallas industrial district at a cost of about $100,000.

MISSOURI PACIFIC.—This company plans the construction of a boiler house at Nevada, Mo., estimated to cost about $10,000.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This road has been authorized to construct a branch line of railroad in Sequatchie county, Tenn., from a point on its Sequatchie Valley branch at mile post 33.4 in a general southwesterly direction a distance of about one mile. The estimated cost of construction is $23,700 for the branch line and $14,800 for yard tracks.

NEW YORK, NEW HAVEN & HARTFORD.—A contract has been awarded to the Roberts & Schaefer Company, Chicago, for the construction of a five-track reinforced concrete coaling and sanding plant at Cedar Hill Yard, New Haven, Conn. This plant will have a capacity of 2,400 tons with automatic electric elevating skips of a capacity of 150 tons per hour.

NORTHERN PACIFIC and MONTANA EASTERN.—Briefs have been filed with the Interstate Commerce Commission on the application of the Northern Pacific for authority to build a branch line from Glendive to Circle and Brockway, Mont., 64 miles, and the application of the Montana Eastern, a subsidiary of the Great Northern, for authority to build a branch from Richey to Circle and Brockway, 55 miles, which was dated on the day following the filing of the Northern Pacific application. The two lines would parallel each other from Circle to Brockway, 12 miles, and the two cases were combined for hearing. Each company opposes the granting of the application of the other, while the receivers of the Chicago, Milwaukee & St. Paul, who had originally opposed both applications, have withdrawn the opposition, substituting a request that the commission attach conditions to any order it may issue authorizing either of the lines so as to permit the C. M. & St. P., to connect any line it may build from a point on its line between Terry and Miles City with whatever line may be constructed by either of the applicants and to operate over it from Circle to Brockway. The Montana commission, which conducted a hearing for the federal commission, has recommended that it grant the application of the Northern Pacific and deny that of the Montana Eastern. The Northern Pacific in its brief says that the communities in the territory favor its project, while the Great Northern urges that the Northern Pacific application be denied, offering it trackage rights over its lines from Newlon Junction to Brockway, which it says would insure service with the most efficient use of existing facilities and the least capital investment. It has no objection to the Northern Pacific being allowed to build from Glendive to any point southeast of the Sheep Mountain divide.

OREGON TRUNK.—The Interstate Commerce Commission has granted this company's petition for an extension to April 25 of the time within which it is required to notify the commission whether the terms proposed by the Southern Pacific, relating to joint use of tracks in eastern Oregon, are acceptable. The commission, in issuing certificates authorizing the construction of several new lines in Oregon, imposed conditions requiring joint use of certain trackage to avoid a duplication of facilities, and the roads have heretofore failed to agree on the terms.

PENNSYLVANIA.—This road has awarded a contract for the construction of a bridge at Overbrook terrace, Collingswood, N. J., to cost $26,000, to the T. J. Foley Company, of Pittsburgh, Pa. It has also let a contract for the construction of eight intertrack platforms at its South Philadelphia perishable products terminal, to cost about $65,000, to Sinclair & Grigg, of Philadelphia, Pa. Another contract has been awarded for the construction of a substructure of a bridge over the Wabash river at Terre Haute, Ind., to cost about $260,000, to the Dravo Contracting Company of Pittsburgh, Pa.

ST. LOUIS-SAN FRANCISCO.—A contract has been let to the Gerhardt Construction Company, Cape Girardeau, Mo., for the construction of a one-story tile and stucco passenger station, with outside dimensions of 158 ft. by 30 ft., at Holly Springs, Miss., estimated to cost $45,000. A contract for the construction of reinforced concrete foundations for shop buildings, roundhouse, turntable, water tower and cinder pits at the new locomotive terminal at Yale, Tenn., has been awarded to the United Construction Company, Cincinnati, Ohio, at a cost of $60,000. Company forces will be employed in the construction of a seven-stall addition to the North side roundhouse and a 60-ft. extension to the West side coach house at Springfield, Mo., to cost about $100,000.

SEABOARD-ALL FLORIDA.—The Interstate Commerce Commission has granted an extension of time to October 1 for the completion of the line from a connection with the Fort Myers-Estero line to Punta Rassa, Fla.

WABASH.—Plans have been prepared for the construction of a steel and concrete viaduct to carry the tracks of this company across Vandeventer avenue at Market street, St. Louis, Mo. The new structure, to replace one now in service, will be made necessary by the widening of Vandeventer avenue from 60 ft. to 100 ft.

Railway Finance

ALABAMA, TENNESSEE & NORTHERN.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,000,000 of prior lien 30-year 6 per cent bonds and to sell them, together with $187,000 of similar bonds, the proceeds to be used in connection with the extension of the company's line from Calvert to Mobile, Ala., and the improvement of the present line.

ATLANTIC COAST LINE.—*Extra Dividend.*—This company has declared an extra dividend of $1.50 in addition to the regular semi-annual dividend of $3.50 on the common stock, both payable July 11 to stock of record June 15. This is the first declaration on the new common to which stockholders were offered the right to subscribe at par in proportion of one share additional common for each five shares held November 30, 1926. The company paid a total of $3 in extra dividends last year.

BANGOR & AROOSTOOK.—*New Director.*—At the meeting on April 20 James J. Phelan, of Hornblower & Weeks, Boston, was elected a director and a member of the executive committee of the road. A change was made in the by-laws providing that the board of directors shall henceforth consist of twelve members, an increase of one.

BELT RAILWAY OF CHICAGO.—1926 *Earnings.*—Annual report for 1926 shows net income of $196,777 as compared with $286,920 for 1925.

BOSTON & MAINE.—*New Directors.*—William J. Hobbs, vice-president, and Roy L. Patrick of Burlington, Vt., have been elected directors succeeding George von L. Meyer and Walter Parker, retired.

CENTRAL OF GEORGIA.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority for a nominal and conditional issue of $2,850,000 of refunding and general mortgage 5 per cent bonds, to reimburse its treasury for expenditures in 1926 and prior years for additions and betterments. The bonds are to be held in the treasury and possibly to be pledged later as collateral for short-term notes.

CHESAPEAKE & OHIO.—*Stockholders Vote Approval of Merger Plan.*—Purchase of the Erie and the Pere Marquette Railroads was authorized at a meeting of Chesapeake & Ohio stockholders at Richmond, on April 19, although a group of the security holders opposed the move. The purchase had been recommended by the railroad's board of directors and its approval is being sought of the Interstate Commerce Commission.

A resolution offered by George S. Kemp, chairman of the Stockholders' Protective Committee, on behalf of the minority holders, proposing that the board of directors of the Chesapeake & Ohio be directed to employ independent counsel to sue O. P. and M. J. Van Sweringen and all persons who are or have been since 1923 directors of the Chesapeake & Ohio and to require of them "a full and accurate accounting of the financial and other operations of the company since January 1, 1926," also, was defeated by a similar vote.

The vote to purchase was 810,437 for and 126,498 against. Speakers supporting the minority protest concentrated an attack upon the financial structure of the Erie, declaring that road "a menace, a danger and a speculation."

W. J. Harahan, president of the Chesapeake & Ohio, as chairman of the meeting, replied at length to the attacks, detailing the reasons why the board of directors devised the plan to absorb the two lines.

"They were the only two logical railroads for our purposes which have not already been taken in by the great systems," he told the stockholders, "and purchase of them is necessary to our expansion program. After a while the Chesapeake would find itself alone, surrounded by antagonistic lines, and it is to forestall this eventuality that the merger is contemplated."

The minority stockholders protested against the voting of stock standing in the name of O. P. Van Sweringen, M. J. Van Sweringen, the Vaness Company of Ohio or stock held or voted in their behalf.

A determined fight lasting through the afternoon was made by the protesting stockholders, who subjected President Harahan to detailed questioning regarding comparative earnings of the Norfolk & Western, the Chesapeake & Ohio and the Erie.

A resolution offered by George Cole Scott, proposing that the number of directors be reduced from twelve to ten, was adopted.

H. B. Erminger, Jr., Chicago, was elected a director to succeed John S. Bryan, of Richmond, resigned.

CHICAGO & NORTH WESTERN.—*Prospects for Business.*—President F. W. Sargent is quoted as follows:

"March earnings will be substantially the same as last year in both gross and net. Crop prospects in the Northwest are particularly good due to an abundance of rain. Freight business is ahead of last year but passenger traffic is slightly lower. Building and construction is going ahead at a rapid rate in our territory and merchandise is moving at a good pace. We expect to move a great deal of iron ore the coming month."

New Director.—C. W. Nash, president of Nash Motors Company, has been elected a director to succeed J. C. Caldwell.

CHICAGO & WESTERN INDIANA.—1926 *Earnings.*—Annual report for 1926 shows net income of $664,318 as compared with $865,001 for 1925.

CHICAGO, MILWAUKEE & ST. PAUL.—*Appeal of Minority Bondholders.*—The United States Circuit Court of Appeals at Chicago on April 20 took under advisement a motion by attorneys for the Jameson committee of minority bondholders of the Chicago, Milwaukee & St. Paul asking for an injunction against the road and its reorganization managers to restrain them from forfeiting the right of the committee to participate in the reorganization. The court also has under advisement an appeal from the plan of reorganization upheld by Federal Judge James H. Wilkerson.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—*Tentative Valuation.*—The final value for rate-making purposes as of 1918 was found to be $13,975,000 for the common-carrier property owned and used and $53,503,650 for that used, including leased lines, in a tentative valuation report made public on April 20 by the Interstate Commerce Commission. The company owned property which it leased to the Chattanooga Union Station Company, valued at $615, and it leased property valued at $39,528,650, of which $39,500,000 was assigned to that leased from the Cincinnati Southern. The outstanding capitalization was $7,323,400 and the investment in road and equipment as stated in the books was $14,721,720. The cost of reproduction new of the property owned was stated as $16,290,166 and that of the property used as $54,323,751, while the cost of reproduction, less depreciation, was placed at $11,003,754 for the property owned and $43,297,283 for that used. The company owned 127 acres of land, assigned a valuation of $15,875, and used 2,723 acres, assigned a valuation of $1,124,324. The Cincinnati Southern had no capital stock but had outstanding $17,982,000 of funded debt issued by the city of Cincinnati to finance the construction and improvement of the property.

DENVER & RIO GRANDE WESTERN.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $1,575,000 4½ per cent equipment trust certificates, to be sold to the Guaranty Company of New York, the highest bidder, at 98.3017.

GULF, MOBILE & NORTHERN.—*Terminal Facilities.*—This company and the Jackson & Eastern have applied to the Interstate Commerce Commission for authority to engage in transportation over the line of the New Orleans Great Northern at Jackson, Miss., for 5.7 miles, and to jointly use the terminal facilities at Jackson.

ILLINOIS CENTRAL.—1926 *Earnings.*—Annual report for 1926 shows net income after interest and other fixed charges of $17,150,398 equivalent after dividends on the preferred stock to $12.06 a share on the common stock. Net income in 1925 was $17,551,742 or $12.86 a share. Selected items from the income statement follow:

	1926	1925
Average mileage operated	6,435.61	6,243.25
RAILWAY OPERATING REVENUES	$186,632,490	$178,169,625
Maintenance of way	$27,756,246	$26,355,918
Maintenance of equipment	41,683,536	38,657,683
Transportation	64,633,793	62,476,987
TOTAL OPERATING EXPENSES	$143,119,862	$135,382,527
Operating ratio	76.69	75.99
NET REVENUE FROM OPERATIONS	$43,512,628	$42,787,099
Railway tax accruals	12,344,721	12,729,951
Railway operating income	$31,120,465	$30,018,803
Equipment rents, Net Dr.	1,573,573	618,891
Joint facility rents, Net Cr.	647,659	527,032
NET RAILWAY OPERATING INCOME	$30,194,551	$29,926,943
Non-operating income	4,540,606	3,623,813

	1926	1925
Gross Income	$34,735,157	$33,550,757
Rent for leased roads	2,384,587	1,770,246
Interest on funded debt	14,525,000	13,609,364
Total Deductions from Gross Income	$17,584,758	$15,999,014
Net Income	$17,150,398	$17,551,742

Johnsonburg. — *Abandonment.* — This company has applied to the Interstate Commerce Commission for authority to abandon about 18 miles of its line, from Johnsonburg to Clermont, Pa., on the ground that the two main industries on the line have discontinued operations.

Missouri Pacific.—1926 *Earnings.*—Annual report for 1926 shows net income after interest and other fixed charges of $8,631,667 equivalent to $12.02 a share on the 5 per cent cumulative preferred stock, no dividends on which have ever been paid. Net income in 1925 was $7,648,208 or $10.65 a share on the preferred. Selected items from the income statement follow:

	1926	1925
Average mileage operated	7,347.09	7,337.62
Railway Operating Revenues	$133,990,294	$130,831,661
Maintenance of way	$21,262,028	$20,465,706
Maintenance of equipment	26,532,577	25,895,938
Transportation	47,481,048	48,307,743
Total Operating Expenses	$102,851,944	$102,276,500
Operating ratio	76.76	78.17
Net Revenue from Operations	$31,138,351	$28,555,162
Railway tax accruals	5,612,341	5,266,438
Railway operating income	$25,488,846	$23,253,239
Hire of freight cars, Dr. Bal.	4,286,254	4,038,149
Joint facility rents	1,296,224	1,329,718
Net Railway Operating Income	$20,333,786	$18,013,064
Non-operating income	3,621,286	4,459,088
Gross Income	$23,955,072	$22,472,152
Rent for leased roads	138,081	138,845
Interest on funded debt	15,007,530	14,524,188
Total Deductions from Gross Income	$15,323,405	$14,823,944
Net Income	$8,631,667	$7,648,209

New Orleans, Texas & Mexico.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized the issuance of $930,000 4½ per cent equipment trust certificates, series C, to be sold at not less than 98.666 per cent of par to Freeman & Co. of New York, the highest of four bidders, which price gives an average annual cost of approximately 4.71 per cent. The equipment includes 11 locomotives, 12 passenger train cars, 20 caboose cars, 100 ballast cars and one wrecker having a total approximate cost of $1,243,812.

New York, New Haven & Hartford.—*Annual Meeting.*—At the annual stockholders' meeting in New Haven on April 20, President Edward J. Pearson stated that the year 1926 was one of high records in freight traffic. Last year's business, he said, had run along about on a level with previous years.

"With a high record of freight traffic," President Pearson said, "the service of the company has been operated with a minimum of man hours of personnel. During the year which is ahead higher expenses are in prospect by reason of increased wages. These are affecting all railroads. There is this element to be taken into account in looking ahead; also the possibility of some reduction of traffic. How well business will hold up it is impossible to tell until later. Business conditions in New England, however, are encouraging, and we are hopeful for a good year."

The stockholders authorized the lease to the New York, Westchester & Boston of the portion of the New Haven's unused right of way from a point in Harrison, N. Y., to a point in Port Chester, N. Y., together with the double track line of the railroad to be constructed on the right of way, for a term of 25 years, with the right of renewal for an additional term for the same period.

Norfolk Southern.—1926 *Earnings.*—Annual report for 1926 shows net income after interest and other fixed charges of $813,578 equivalent to $5.08 a share on the common stock. Net income in 1925 was $512,524 or $3.20 a share. Selected items from the income statement follow:

	1926	1925
Average mileage operated	.....	.....
Railway Operating Revenues	$10,066,487	$9,131,878
Maintenance of way	$1,327,276	$1,191,523
Maintenance of equipment	1,672,702	1,320,534
Transportation	3,499,543	3,552,143
Total Operating Expenses	$7,137,700	$6,686,088
Operating ratio	70.91	73.22
Net Revenue from Operations	$2,928,787	$2,445,790
Railway tax accruals	671,864	531,491
Railway operating income	$2,252,191	$1,900,088
Equipment rents—Dr.	443,894	368,210
Joint facility rents—Dr.	22,210	23,422
Net Railway Operating Income	Not shown	
Total other income	$79,909	$73,226
Gross Income	$2,332,100	$1,973,314
Rent for leased roads	167,102	167,102
Interest on funded debt	851,219	857,380
Total Deductions from Gross Income	$1,518,523	$1,460,790
Net Income	$813,578	$512,524

Old Colony.—*Stock.*—This company, which is leased by the New York, New Haven & Hartford, has been authorized by the Interstate Commerce Commission to issue 8,917 shares of common stock, having a $100 par value for the purpose of paying for permanent improvements made by the parent company. It is proposed to sell the stock after due notice at public auction at not less than par.

Pennsylvania, Ohio & Detroit.—*Bonds.*—The Interstate Commerce Commission has approved the issue of $22,000,000 first and refunding mortgage 4½ per cent bonds, series A, delivery to the Pennsylvania and their sale by that company to Kuhn, Loeb & Co., at 92½. The public offering of these bonds was reported in the *Railway Age* of March 12.

Pittsburgh & Lake Erie.—*Tentative Valuation.*—The Interstate Commerce Commission has issued its tentative valuation report, as of 1916, finding the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $54,020,000, and that of the property used, including $35,920,265 for leased lines, to be $89,940,265. The outstanding capitalization as of valuation date was $37,185,593, and the investment in road and equipment, as stated in the books, was $38,888,677. The cost of reproduction new, exclusive of land, was placed at $50,373,842 for the property owned and $84,588,691 for the property used, while the cost of reproduction less depreciation was placed at $40,409,277 for the property owned and $68,485,370 for that used.

St. Louis-San Francisco.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Butler County by lease and by purchase of its stock for $650,000, and of the St. Louis, Kennett & Southeastern by lease and by purchase of its stock for $300,000.

Bonds.—The Frisco has also applied for authority to issue $650,000 of prior lien mortgage 5 per cent bonds to be used in purchasing the stock of the Butler County.

Western New York & Pennsylvania. — *Abandonment.* — The Interstate Commerce Commission has authorized this company and the Pennsylvania, lessee, to abandon that portion of the Kinzua branch from Morrison to Gates, 8.09 miles, all in McKean County, Pa. This line was operated for a while by the Kinzua Valley Chemical Company which company discontinued operation of the railroad in 1925 because of the exhaustion of the supply of chemical wood.

Average Price of Stocks and Bonds

	Apr. 19	Last week	Last year
Average price of 20 representative railway stocks	110.91	110.81	87.72
Average price of 20 representative railway bonds	94.70	94.73	91.23

Dividends Declared

Atlantic Coast Line.—Common, $3.50, semi-annually; common, $1.50, extra, both payable July 11 to holders of record June 15.

International Railways of Central America.—Preferred, 1¾ per cent, quarterly, payable May 16 to holders of record April 30.

Hudson & Manhattan.—Common, $1.25, semi-annually, payable June 1 to holders of record May 16.

Mahoning Coal Railroad.—Common, $12.50, quarterly, payable May 2 to holders of record April 14.

Valuation Reports

The Interstate Commerce Commission has issued final or tentative valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as to the respective valuation dates as follows:

Final Reports

Macon Terminal	$1,332,086	1917

Tentative Reports

Railway Transfer of Minneapolis	$3,000	1917
(used)	926,625	....
Pittsburgh & Lake Erie	54,020,000	1916
Dexter & Northern	34,359	1919

Railway Officers

Executive

Walter E. Teague, office manager for the operating department of the Southern Pacific at San Francisco, Cal., has been elected vice-president and general manager of the Los Angeles Union Terminal Company (a subsidiary of the Southern Pacific), with headquarters at Los Angeles, Cal.

A. T. Mercier, general manager of the San Diego & Arizona, has been elected president and general manager, with headquarters at San Diego, Cal., succeeding **John D. Spreckels**, who died on June 7, 1926. The position of president has been vacant since that time. Mr. Mercier was born at New

A. T. Mercier

Orleans, La., on December 11, 1881, and was educated at Rugby Academy and at Tulane University, where he completed a course in civil engineering in 1903. He entered railway service in January, 1904, as transitman and clerk to a roadmaster of the Southern Pacific, with headquarters at Los Angeles, Cal. He was then advanced to assistant gang foreman with the same headquarters, which position he held until February, 1906. From February, 1906, until March, 1907, he was assistant engineer in charge of reconstruction work on the Colorado River territory, with headquarters at Los Angeles; from March, 1907, until June, 1907, he was general foreman and engineer of bridges and buildings in charge of steel bridge construction, with the same headquarters; from June, 1907, until November, 1908, he was engineer and general foreman in charge of terminal construction work with headquarters first at San Pedro, Cal., and later at Los Angeles. Mr. Mercier served as assistant division engineer of the Los Angeles division, from November, 1908, until November, 1911, when he became assistant district engineer of the Southern district, with headquarters at Los Angeles. From November, 1912, until August, 1913, he served as division engineer of the San Joaquin division, with headquarters at Bakersfield, Cal., and from the latter date until February, 1917, was division engineer of the Los Angeles division, with headquarters at Los Angeles. In February, 1917, Mr. Mercier was appointed assistant superintendent of the Shasta division at Dunsmuir, Cal., and in September, 1918, was advanced to superintendent of the Portland division at Portland, Ore. In November, 1921, he was appointed general manager of the San Diego & Arizona at San Diego, Cal., which position he held until the time of his recent election as president and general manager.

Financial, Legal and Accounting

R. P. Eubank, who has been appointed general real estate agent of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Richmond, Va., was born on November 14, 1880, in King William county, Va., and attended Virginia Polytechnic Institute from 1903 until 1905. He entered railway service in October, 1905, as a rodman in the engineering party of the Carolina, Clinchfield & Ohio, and from February, 1906, until June, 1908, was assistant engineer on the same road. At the latter time he became assistant engineer in charge of field work on the hydro-electric plant at Emporia, Va., which position he held until December 31, 1909. He then became assistant engineer in the construction department and real estate department of the Chesapeake & Ohio, and in February, 1916, was appointed assistant real estate agent. On March 1, 1920, Mr. Eubank was advanced to the position of real estate agent of the same road at Richmond, Va., which position he was holding at the time of his recent appointment.

R. P. Eubank

W. C. Smith, tax agent on the Spokane, Portland & Seattle, has been appointed acting general claim agent, with headquarters at Portland, Ore., succeeding **Herbert K. Relf**, deceased.

The headquarters of **G. B. Herbert**, assistant auditor of the Texas and Louisiana lines of the Southern Pacific, and **R. Drushcchke**, assistant auditor of disbursements, have been removed from New Orleans, La., to Houston, Tex.

Operating

O. D. Gephart has been appointed inspector of transportation of the Denver & Rio Grande Western, with headquarters at Denver, Colo.

H. R. McKee, trainmaster on the New Mexico division of the Atchison, Topeka & Santa Fe at Las Vegas, N. M., has been promoted to assistant superintendent of the Panhandle division, with headquarters at Wellington, Kan.

H. G. Warvel, assistant trainmaster on the Pennsylvania, has been promoted to trainmaster on the Richmond division, with headquarters at Richmond, Ind. **J. H. McClintock**, assistant trainmaster, has been promoted to trainmaster on the Columbus division with headquarters at Columbus, Ohio.

G. M. Richards, Jr., general manager of the Cumberland & Manchester, with headquarters at Barbourville, Ky., until its acquirement by the Louisville & Nashville and operation as a part of that property, has been elected general manager of the Frankfort & Cincinnati, with headquarters at Frankfort, Ky., and with jurisdiction over all departments. He succeeds **J. H. Switzer** who has been appointed superintendent with supervision over transportation, maintenance and mechanical matters.

Ralph F. Ray, who has been appointed assistant general manager of the Denver & Rio Grande Western, was born at Wellsville, Ohio, on August 22, 1883, and was graduated from a civil engineering course at the Western University of Pennsylvania in 1903. During summer vacations from 1899 to 1902 Mr. Ray served in the engineering corps of the Pennsylvania lines west and from 1903 to 1909 he served in various maintenance and construction divisions of the same department. He then became assistant engineer and designing engineer on construction and design on the Missouri Pacific and from 1915 to 1917 he was engaged in special work for the vice-president in charge of operation and on a leave of absence as an engineering assistant in the compilation of financial and operating reports on various Western railroads. At the end of this time Mr. Ray was appointed assistant to the president and receiver of the D. & R. G. W., becoming assistant to the federal general manager under the United

States Railroad Administration in 1918. In 1920 he was appointed assistant to the general manager and chief operating officer, becoming general supervisor of wages and working agreements three years later, a position he held until his advancement to assistant general manager on April 1.

Albert Ewing, who has been promoted to assistant general manager of the Western district of the Eastern lines of the Atchison, Topeka & Santa Fe, was born on July 7, 1875, at Princeton, Ill. He entered the service of the Western Union Telegraph Company at Princeton at the age of 15 as a telegraph messenger, learning telegraphy with that company before he became a telegraph operator on the Chicago, Burlington & Quincy in 1892. Mr. Ewing served in this capacity and as an agent at various stations on the Burlington until September 1, 1897, and for the next six years he was an operator and agent at a number of different points on the Santa Fe. From November 1, 1903, to February 1, 1905, he was transportation clerk in the office of the general superintendent of the Santa Fe at La Junta, Colo., and he was then appointed chief clerk in the same office, later being transferred to the office of the general superintendent at Newton, Kan. On June 1, 1909, Mr. Ewing was promoted

Albert Ewing

to trainmaster on the Rio Grande division and until January 1, 1917, he acted in that position on this division and on the Missouri and Illinois divisions. He was then advanced to superintendent and was assigned successively to the Slaton, Pecos and Western divisions. On June 20, 1920, Mr. Ewing was transferred to the New Mexico division, with headquarters at East Las Vegas, N. M., a position he held until his promotion to assistant general manager, with headquarters at Topeka, on April 1.

H. N. Walters, trainmaster of the Cincinnati division of the Chesapeake & Ohio, with headquarters at Stevens, Ky., has been appointed assistant superintendent of the Cincinnati and Northern divisions, with headquarters at Covington, Ky. **H. A. Iuler** has been appointed trainmaster at Stevens, Ky., succeeding Mr. Walters, and **A. E. Hannes** has been appointed trainmaster of the Cheviot sub-division, with headquarters at Cheviot, O., succeeding Mr. Iuler. **S. H. Pulliam,** division engineer, with headquarters at Richmond, Va., has been appointed trainmaster, with jurisdiction over Strathmore Yard and the Virginia Air Line and Buckingham sub-divisions, with headquarters at Strathmore, Va. **S. E. Dearien** has been appointed terminal trainmaster of the Charleston, West Va., terminal, with headquarters at Charleston. **J. R. Cary, Jr.,** has been appointed trainmaster of the Coal River sub-division at St. Albans, W. Va., succeeding Mr. Dearien, and **H. Kindt** has been appointed assistant trainmaster of the Coal River sub-division at St. Albans, succeeding Mr. Cary. **R. Vawter** has been appointed assistant trainmaster of the Logan Coal sub-division at Peach Creek, W Va., succeeding Mr. Kindt. **K. R. Ketcham** has been appointed assistant trainmaster of the Sandy Valley & Elkhorn sub-division, with headquarters at Jenkins, Ky., succeeding Mr. Vawter.

Traffic

L. C. Bouchard, general agent for the Southern Pacific at Memphis, Tenn., has been promoted to office manager to the traffic manager at Chicago, succeeding **M. J. Curry,** resigned to accept service with another company. **C. A. Bevis,** district freight and passenger agent at Cincinnati, Ohio, has been promoted to succeed Mr. Bouchard.

F. C. Jerome, assistant general freight agent of the New York Central Lines, Buffalo and East, with headquarters at New York City, has been appointed general freight agent of that road and of the West Shore, with the same headquarters. **C. I. Johnson** has been appointed assistant general freight agent of the lines East of Buffalo and of the West Shore, with headquarters at New York City.

Louis J. Brinkman, who has been appointed general freight agent of the Michigan Central, with headquarters at Detroit, Mich., was born June 4, 1880, at Michigan City, Ind. Mr. Brinkman was graduated from high school in 1899 and entered railroad service in January, 1900, as freight agent for the Indiana Transportation Company. On May 1, 1901, he left the service of the Indiana Transportation Company to become abstract and night ticket clerk of the Michigan Central with headquarters at Michigan City, Ind. On January 1, 1902, he was appointed day ticket and freight clerk with headquarters in the same city. From November 10, 1902, to May 13, 1903, Mr. Brinkman was ticket agent of the same road after which he was appointed agent. On May 1, 1912, he was transferred to Kalamazoo, Mich., and on July 4, 1913, to the Junction Yards of the Michigan Central. On February 1, 1915, he was appointed freight claim agent of the same road with headquarters at Detroit, Mich., and on January 1, 1916, was promoted

L. J. Brinkman

to the position of general agent, with the same headquarters, which position he was holding at the time of his recent appointment.

Mechanical

Albert E. Jones, general foreman in the mechanical department of the Chicago Great Western at St. Paul, Minn., has been promoted to superintendent of shops at Oelwein, Iowa.

H. C. Caswell, general foreman in the mechanical department of the Wabash at the Detroit (Mich.) terminals, has been appointed superintendent of the Decatur (Ill.) locomotive shop.

C. B. Smith, assistant to the mechanical superintendent of the Boston & Maine, with headquarters at Boston, Mass., has been appointed engineer of tests. **L. C. Winship,** electrical superintendent and supervisor of power plants, with headquarters at North Adams, Mass., has been appointed electrical engineer. **I. C. Blodgett,** also assistant to the mechanical superintendent at Boston, has been appointed supervisor of schedules, reporting to the assistant to the mechanical superintendent.

A. K. Galloway, district master mechanic of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been appointed superintendent of motive power of the Western lines, with headquarters at Cincinnati, Ohio, succeeding **W. Malthaner,** who has been granted a leave of absence on account of illness. **G. R. Galloway,** district master mechanic of the Southwest district, at Cincinnati, has succeeded A. K. Galloway as district master mechanic at Baltimore. **E. J. McSweeney,** master mechanic at Akron, Ohio, has been advanced to district master mechanic of the Southwest district. **Harry Rees,** general foreman in the locomotive department at New Castle Junction, Pa., has been appointed master mechanic at Akron, Ohio, and **H. J. Burkley** and **J. J. Herlihy,** master mechanics at Glen-

wood, Pa., and Washington, Ind., respectively, have interchanged positions.

Lawrence Richardson, assistant to the president of the Boston & Maine, with headquarters at East Cambridge, Mass., has been appointed mechanical superintendent in charge of the locomotive and car departments, with headquarters at Boston, Mass., succeeding **W. O. Forman,** who is to join the staff of Manning, Maxwell & Moore, Inc., Mr. Richardson was graduated from Cornell in 1910. After ten years of railroad experience, he joined the naval aviation corps during the war. After the war he joined the Railroad Administration and was supervisor of equipment until 1920, when as mechanical engineer for the American Steel Foundries Company, he began three years of duty with the Virginia. Mr. Richardson entered the

Lawrence Richardson

service of the Boston & Maine about a year ago in connection with the construction of its new $4,000,000 unified freight terminals. In February of this year he was appointed assistant to the president, which position he was holding at the time of his appointment as mechanical superintendent.

Henry H. Urbach, who has been promoted to superintendent of motive power of the Chicago, Burlington & Quincy Lines West of the Missouri river, was born on February 4, 1890, at Sutton, Neb., and attended high school at Liovett, Neb. Mr. Urbach entered the service of the Burlington on February 18, 1907, as a machinist's apprentice at Havelock, Neb. After finishing the period of apprenticeship he served as a machinist at the same point until July, 1914, when he was transferred to Alliance, Neb. The following year he was transferred to Edgemont, S. D., and in April, 1915, he was appointed roundhouse foreman at Seneca, Neb., where he remained until March, 1917, when he was transferred to Alliance. Mr. Urbach was advanced to general foreman at Edgemont during the same year and until May, 1923, he served in that capacity at Alliance and at Denver, Colo. He was then promoted to the position of assistant master mechanic at Galesburg, Ill., where he remained until September, 1923, when he was advanced to master mechanic of the Brookfield division at Brookfield, Mo. Late in 1925 Mr. Urbach was transferred to McCook, Neb., and in July, 1926, he was

Henry H. Urbach

appointed assistant superintendent of motive power of the Lines East of the Missouri river, with headquarters at Chicago, a position he held until his appointment as superintendent of motive power of the Lines West of the Missouri river, with headquarters at Lincoln, Neb.

Engineering, Maintenance of Way and Signaling

J. D. Keiley has been appointed division engineer of the Chesapeake & Ohio, with headquarters at Clifton Forge, Va., succeeding **T. H. Greene,** who has been transferred in the same capacity to Richmond, Va., succeeding **S. H. Pulliam,** promoted. **J. W. Knapp, Jr.,** has been appointed assistant division engineer at Richmond, Va., succeeding **L. J. Drumeller,** who has been transferred in the same capacity to Russell, Ky., succeeding **J. D. Keiley** (supervisor), promoted.

Obituary

Fred J. Fishback, trainmaster on the Louisville division of the Louisville & Nashville since 1905, died at his home at Louisville, Ky., on March 27, at the age of 57 years. At the time of his death Mr. Fishback had completed 42 years in the service of the L. & N.

Herbert Kemper Relf, general claim agent of the Spokane, Portland & Seattle, with headquarters at Portland, Ore., who died in that city on April 10, was born on June 26, 1871, at Superior, Wis. Mr. Relf entered railway service at the age of 15 as a rodman on the Northern Pacific in Montana and in 1888 he was advanced to levelman. The following year he served as clerk to the division engineer at Tacoma, Wash., and from 1890 to 1894 he engaged in the real estate, insurance and banking business at South Bend, Wash. Mr. Relf returned to the Northern Pacific in September of the latter year as a clerk in the purchasing department at St. Paul, Minn., becoming clerk to the general superintendent of the Great Northern at Great Falls, Mont., in September, 1895. In April, 1896, he again entered the service of the Northern Pacific as a clerk in the engineering department, serving later in the same capacity in the passenger and legal departments at St. Paul. Mr. Relf was graduated from the College of Law of the University of Minnesota in 1898 and in November of the same year he was appointed district claim agent. He acted in this capacity until January 10, 1909, except for a brief period during 1904 when he became clerk to the general superintendent of the Coast lines of the Atchison, Topeka & Santa Fe at Los Angeles, Cal. Mr. Relf was then promoted to general claim agent of the S. P. & S., in which position he served this company and its subsidiaries, the Oregon Trunk, the Oregon Electric and the United Railways continuously until his death. Since August 1, 1918, he had also been chairman of the general safety committee of the S. P. & S.

Henry L. Des Anges, engineer of floating equipment of the Long Island, died at his home in Flushing, L. I., on April 16. Mr. Des Anges was born in Trenton, N. J., on May 20, 1862, and was graduated from the Freehold Institute, Freehold, N. J., in 1880. He entered railway service in March, 1881, as an apprentice in the Meadow shops of the Pennsylvania. He was then transferred to the drafting department, where he remained a year and a half. About this time he was furloughed by the Pennsylvania, and engaged to do special work in South America by W. R. Grace & Co. Six months later he was placed in charge of the locomotive repair shops of the Oroya Railroad of Peru, and then for two years acted as operating head of the same road. Returning to the United States in 1889, Mr. Des Anges rejoined the Pennsylvania, being assigned to take charge of the designing of compound engines. He was then appointed general foreman of the yards at Hoboken, N. J., and later became assistant to the master mechanic. In April, 1900, Mr. Des Anges was placed in charge of the ferry operation of the Long Island. Two years later he was also placed in charge of the River and Harbor Transportation Company, which concern looked after the floating of freight between the Pennsylvania and the Long Island Railroad terminals. He also had charge of the force which built the marine repair shops at Whitestone, L. I. In April, 1906, he became superintendent of the Montauk Steamship Company, and in 1915 became marine superintendent in charge of every department of marine work on the Long Island. On March 16, 1926, Mr. Des Anges was appointed engineer of floating equipment, which position he was holding at the time of his death April 16.

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Two Sections—Section Two

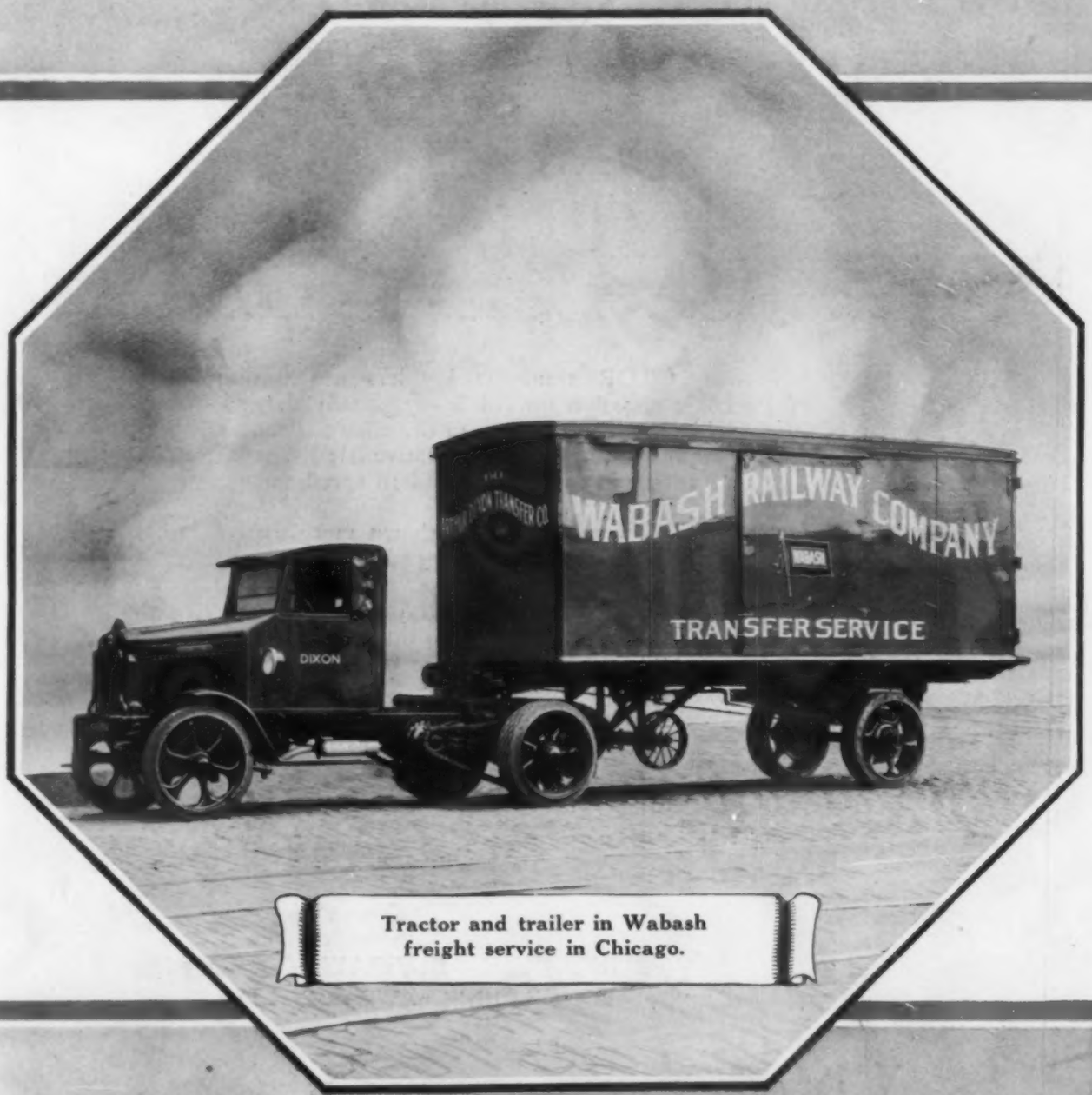
Railway Age

Motor Transport Section

Devoted to the Co-ordination of Railway and Highway Service

FIRST HALF OF 1927—No. 21 NEW YORK—APRIL 23, 1927—CHICAGO SEVENTY-SECOND YEAR

APR 28 1927



Tractor and trailer in Wabash freight service in Chicago.

Articles in This Issue:

Both Large and Small Buses Favored

What the B. & M. Transportation Company Did in 1926

The Taxes That Buses and Trucks Pay

Wabash Uses Tractors and Trailers in Chicago

Highway Service and the Railroad

MOTOR transport builders are turning their attention toward heavy, speedy, large capacity vehicles. The foremost of these have found the adoption of Westinghouse Automotive Air Brakes a decided advantage in controlling modern speed and power.

Railroad companies have shown more than a casual interest in vehicles so equipped. Their experience in transportation has taught the value of efficient retardation and the futility of carrying heavy loads at high speeds without it. Through this recognition, Westinghouse is enabled to serve the railroads in a new field with a time tested product—the Westinghouse Automotive Air Brake.

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Railway Age
Motor Transport Section
Devoted to the Co-ordination of Railway and Highway Service
Vol. 82 April 23, 1927 No. 21

Co-ordinated Transportation on the Boston & Maine

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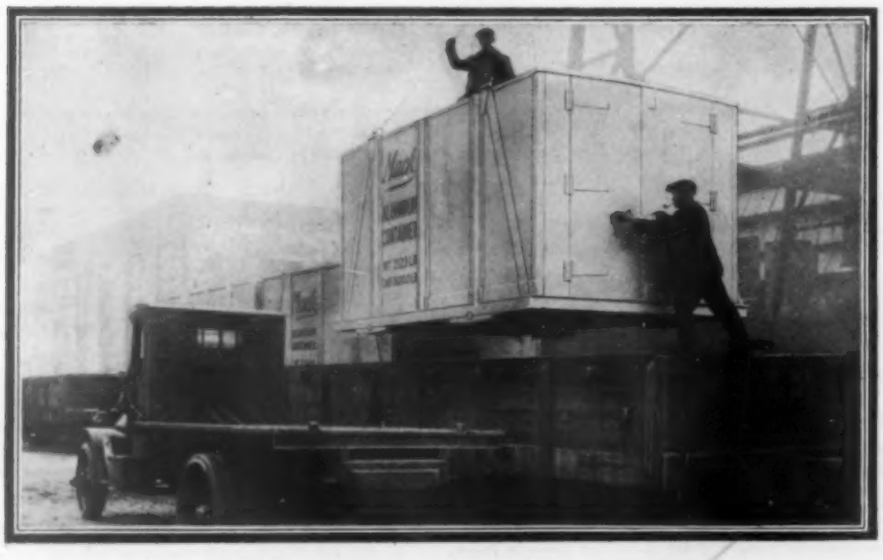
In actual operation the Mack Aluminum Container and Ramp systems have clearly demonstrated their economic value in handling L. C. L. shipments.

In addressing the annual transportation and service meeting of the Society of Automotive Engineers, Mr. D. W. Perrin summarized the advantages of the Container system to the shipper and to the railroad as follows:

To the Shipper

1. Savings in Packing Expense.
2. Convenience of handling in warehouse.
3. Faster Service.
4. Lower rates.
5. Later closing time for acceptance of shipments by railroads.
6. Reduction of loss and damage claims, and of cost in making claims.
7. Reduction in highway transportation costs between shipper and freight station and freight station and consignee.



Container being transferred from freight car to truck.

Railway Age
Motor Transport Section
Devoted to the Co-ordination of Railway and Highway Service

Vol. 82, No. 21 April 23, 1927

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Railway Motor Transport in New England

THE annual reports of the New Haven and the Boston & Maine for 1926 make some brief references to highway transportation which we quote in an article on another page of this issue. Plainly the activities of these roads in the highway field are proving satisfactory. "The results show that real benefits accrue to rail service from the co-ordination of the highway lines with train schedules," says the New Haven report. The Boston & Maine's statement gives some consideration to freight service on the highways, indicating the possibility of further developments in this field. Quite plainly New England is going to maintain its position as a focal point for those interested in seeing what railways can do with the motor vehicle when they adopt it as an ally.

Why the Railways Sometimes Seem Slow

THE statement is not infrequently heard that the railways are slow in getting into the business of bus operation, in spite of the fact that the expansion of the steam railways in this field has been more rapid in the few years since their first entrance into it than that of the electric railways, for example. Entirely aside from the fact that a number of the railways are still to be convinced of the desirability of their undertaking bus operation, there are perfectly sound and understandable reasons for the "slowness" of the others. The principal one is that legal restrictions quite beyond their control have prevented their going ahead even faster than they have. Several railways began long ago to try to start bus operations, only to find that they could not do so. The Reading, for instance, with a very comprehensive plan for the supplementing of its passenger service by the operation of buses, has been waiting for months for authority from the state of Pennsylvania to go ahead. Similarly, the Baltimore & Ohio has met with difficulties in West Virginia; as has the Chicago & Alton in Illinois. Others could be mentioned, but the point is plain. It is true that the railways rarely leap headlong into any new thing; their attitude is conservative. But it is equally true that once they have decided to go ahead, they are sometimes prevented from doing so by restrictions beyond their control. It would be ridiculous to conclude that these restrictions will remain indefinitely. To the contrary, they are certain to disappear in time. In the meantime, the railways are going ahead, studying motor transportation and adopting it where they can. From the standpoint of the railways which want to engage in bus operation, the attitude of some of the state regulatory commissions leaves much to be desired.

Which Is Better, the Large or the Small Bus?

THE question of selecting the proper size bus to meet the requirements is an important one for railway bus operators or prospective bus operators. Upon its decision depends in no small degree the success of the enterprise. It cannot be said that the large bus is the right one under all circumstances, nor can it be said that the small bus is always the right one. In all cases the selection of the size of equipment to be used should be governed by the specific conditions existing in the territory to be served. Experience has indicated that there are certain rather definite rules that can be laid down as to the conditions requiring large buses and the conditions requiring small buses. A number of these conditions are discussed by officers in charge of railway bus operations in an article entitled, "Both Large and Small Buses Favored," which appears in this issue of the *Motor Transport Section*. These are the views of men experienced in bus operation. They are well worth the study of every railway officer interested in the problem of bus operation.

An Encouraging Injunction Against Unfair Competition

REFERENCE is made in another part of this issue of the *Motor Transport Section* to an injunction secured by the Boston & Maine against a bus operator who had camouflaged his intrastate operations, for the carrying on of which he had no authority, by crossing a nearby state line and then returning to the actual terminus of his route, and thus claiming the status of an interstate operator not subject to the jurisdiction of the state commission. In granting the injunction, the court showed tacit agreement with the contention of the Boston & Maine that this kind of operation is a mere subterfuge, designed to circumvent the state law. Other similar instances of bus operators beating the law in this way are fairly common throughout the United States and particularly in New England where it is never far to a state line. Bus operators of this kind have almost if not quite invariably been in competition with railways, this competition being unrestrained and unfair. It seemed that nothing could be done about it, at

least until Congress passes legislation designed to regulate interstate bus lines. The injunction obtained by the Boston & Maine, however, indicates that the railways can have recourse to the courts to relieve situations of this kind, and with a precedent established, such recourse is more than likely to result favorably.

"Insuring the Regularity of Inspection"

THE Motor Transport Section of March 26, contained an editorial on page 1020 entitled, "Insuring the Regularity of Inspection" which referred to the card index system used by the Northland Transportation Company. The editorial stated that the system used by the Northland was described in that issue. Through an error in make-up, however, this article was omitted from last month's *Motor Transport Section.* It is published in this month's issue on page 1296. Officers in charge of the maintenance of buses and trucks will find it of interest.

It's Hard to Keep Up With the News

FORECASTS made at the beginning of the year, that there would be rapid expansion in the ensuing months in the field of railroad bus and truck operation are being borne out by the news of recent weeks. Reports from widely scattered parts of the country relate new instances of railways undertaking bus or truck operation for the first time or expanding operations already in existence. Here are a few, taken at random: The Union Pacific intends to extend its bus tour service in southern Utah to the north rim of the Grand Canyon in Arizona. The Oregon-Washington Railroad & Navigation Company, which has had one bus line in operation for a number of months, has asked for authority to operate two additional lines in western Oregon. The Great Northern has bought a bus line formerly operated by an electric railway in northern Minnesota and will make it a part of the large system operated by the Northland Transportation Company. The Denver & Rio Grande Western has secured authority to operate additional bus lines in southern Colorado in replacement of train service. The Chicago & Alton has acquired two independent bus lines operating parallel to parts of its railway line between Joliet, Ill., and Springfield, and is operating them until it secures from the Illinois Commerce Commission permission to establish a bus line over the entire Joliet-Springfield route. The Reading has applied again for a charter for its bus subsidiary and hopes soon to have a large bus line system operating in Pennsylvania. The Pennsylvania has entered into a new contract for bus service as an extension of one of its branch lines in western Pennsylvania, this being the second Pennsylvania bus operation. The Wabash has contracted for tractor and trailer service in replacement of trap car service between its freight stations in Chicago. The Pennsylvania recently awarded contracts for its fortieth motor truck route for the handling of l.c.l. freight. The Baltimore & Ohio has established a constructive freight station in New York and has contracted with five truckers for the handling of l.c.l. freight through this station. The Missouri Pacific has established its first bus line paralleling its main line between Pueblo and Ordway. As we go to press word comes that the Central of New Jersey has been authorized to substitute buses for trains on one of its branches. These developments leave no room for doubt that the co-ordination of railway and highway transportation by the logical medium, the steam railways, is progressing rapidly.

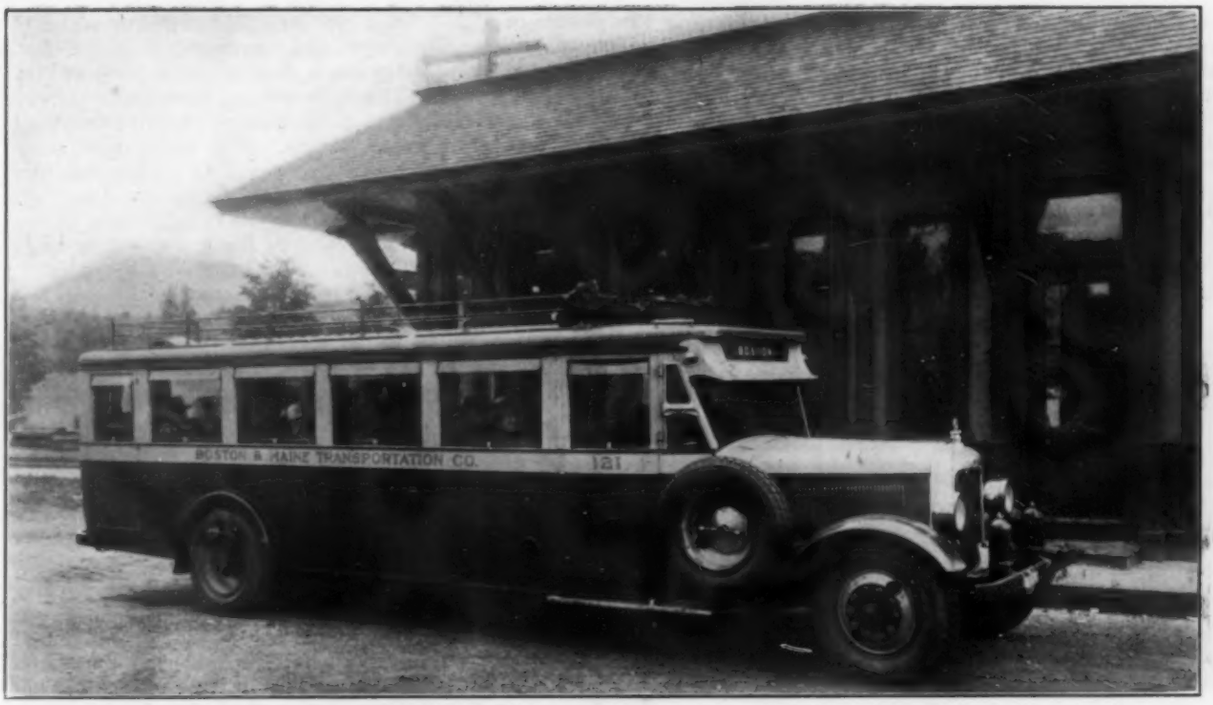
Use of Motor Trucks In Terminals

THE motor truck and the tractor and trailer are assuming a position of constantly increasing importance in the scheme of railway terminal operation. Compared to other railway uses of motor vehicles, motor truck operation in terminals has been in existence for a long time—some roads have used them for years. Only within the last year or two, however, has there been a really rapid development in this direction, due, no doubt, to the fact that the advantages offered by motor vehicles in terminals have only within that period become well known. The developments of recent months appear to indicate that the use of motor trucks, tractors and trailers for the transportation of l.c.l. freight in congested terminals will at no distant date become the usual thing among railways generally.

Terminals where the congestion is most severe have already been subjected to motorization. At Chicago, for example, the Chicago, Rock Island & Pacific and the Wabash are eliminating trap car service to a large extent by the use of tractors and trailers. In New York, service is being greatly expedited and expensive lighterage of freight is being reduced by several of the railways, which are trucking a large part of their freight traffic into Manhattan Island. The motorization of the terminals at St. Louis, Mo., and Cincinnati, Ohio, where the Columbia Terminals Company and the Cincinnati Motor Terminals Company, respectively, do a trucking business under contract with all the railways entering those cities is well known to all railway officers. At Boston, Mass., Philadelphia, Pa., Baltimore, Md., Minneapolis, Minn., San Francisco, Cal., and a number of other cities, motor trucks, tractors and trailers are doing a large part of the terminal transfer work formerly handled by locomotives and cars.

The outstanding benefit gained by railways which have adopted motor vehicles for the transportation of freight in their terminals has been economy—economy both in time and money. Saving in time benefits the shipper most; in saving money benefits the railway. Reductions of from 24 to 72 hours in the time required to handle intra-terminal movements with motorized operation as compared with railway operation are common, and it will scarcely be claimed that the advantage in this accrues only to shippers. In reducing the cost of handling freight within terminals, the motor truck is helping to solve one of the most troublesome problems of the railways, that of reducing the high cost of handling freight, particularly l.c.l., through congested districts.

The interest shown by so many railways in the results being obtained by the pioneer users of trucks in terminals, and the fact that these results have been uniformly favorable to truck operation, forecast still further developments along this line with consequent increased efficiency of railway terminal operation.



A Boston-White Mountain Bus at Twin Mountain, N. H.

What the B. & M. Transportation Company Did in 1926

1,010,744 bus miles operated at cost of $0.28 a mile—Large savings in railway operating expenses made possible

By R. J. Littlefield
Manager, Motor Coach Service, Boston & Maine Transportation Company

BUS operations by the Boston & Maine Railroad were started in the fall of 1924 when all passenger service on the three-mile branch of the Fitchburg division between Ashburnham, Mass., and South Ashburnham was replaced by service over the highway with a white motor bus. This was the first railroad substitution of bus service in the East. In May, 1925, the Boston & Maine Transportation Company, a subsidiary of the railroad, started its first line in Portsmouth, N. H., replacing a railroad-owned electric railway system which served Portsmouth, Rye and a part of North Hampton in the State of New Hampshire and had shown an average deficit of $20,000 for the previous eight years. During 1926, the deficit for the bus operation on the Portsmouth line was $3,018.04, or a reduction of $16,981.96 over the average loss during the last few years of the electric railway service.

Clearing the Road on the Franklin-Bristol Route

However, the electric property was not the only line where the passenger traffic did not support rail service. The Boston & Maine, often called a terminal railroad, was made up, as of January 1, 1926, of 1,372 miles of main lines and 854 miles of branch lines. There were 11 main and 63 branch lines, and nearly all branch and some main lines had more or less unprofitable passenger service.

Complete Substitution for Branch Line Rail Service

On four of these thin branch lines all rail passenger service was discontinued and highway service provided. In every case more frequent service was possible at a considerable reduction in operating costs.

One of these unprofitable lines was the Bristol branch

on the Southern division where a single track line 13 miles long served the New Hampshire towns of Bristol and Hill, connecting with the main line at Franklin. Bus substitution for rail passenger service was made in September, 1925. At that time two passenger trains were operated in each direction daily except Sunday at a cost of $1.17 per mile, which included no charge for interest, overhead or maintenance of tracks or buildings, and with a revenue averaging 51 cents per mile. Highway service now provides three trips in each direction for the town of Bristol, and four trips in each direction for the town of Hill. The equipment consists of two Model 50A

B. & M. Bus No. 1 at Ashburnham, Mass.

White chasses with pay-enter type, Brown bodies with baggage compartments and a seating capacity of 29 passengers when the baggage space is not in use. The first delivery of mail and papers is now made at 9:30 a. m. instead of noon, as formerly by trains, and it is now possible for people from these towns to go to Boston and return the same day.

A special bus is also operated for students between Hill and Franklin, discharging and receiving them at the school, instead of one-half mile away as previously. As all high school students from Hill attend the Franklin school, bus service morning and night is pleasing to parents and school authorities who dislike to have students killing time on streets or in railroad stations on account of train schedules not corresponding with school hours.

During 1926 the bus service on this branch cost 29.9 cents per mile, or 86.2 cents per mile below the cost of the rail service. Depreciation of buses is included in the unit figures on a basis of 200,000 mile life. The revenue from bus operation for the year averaged 31.2 cents per mile. In other words, the Boston & Maine Transportation Company furnished the more frequent service at a cost for 1926 of $12,134.19 against a cost of $24,305.00 for the less frequent rail service. (There was a small reduction of main line steam mileage at the time the substitution was made on account of the train crew running out on the main line several miles for coal.) As the total revenue received from the highway operation was approximately the same as that received by the steam service, the difference between the cost in the two types of service represents the approximate net saving to the railroad.

Roads Kept Open

As Bristol and Hill are served by a highway with several sharp grades, the maximum of which is 14 per cent for a short distance, there was considerable fear on the part of the residents of these localities that the motor service in the winter would not be reliable and connections at Franklin would not be dependable. During the winter of 1925-1926 these towns did not have adequate snow-fighting equipment, and the Boston & Maine used a five-ton Best tractor and a Sargent snow plow to keep the route open. The townspeople were quite pleased with this arrangement as it allowed them to use their private cars as never before. The town officers cooperated to the fullest extent in making the bus activities a success and were always ready to put sand on hills when conditions required.

By agreement the plowing of this route was in every case billed to the towns at the rate of $5 per hour. While this did not cover depreciation of tractor and plow, it more than covered the cost of operation. There were interruptions in the service on two days only (and then not for the entire day) during the winter of 1925-1926. One interruption was on account of ice and the other on account of a severe snowstorm. With these exceptions, no main line connections were missed. In the winter of 1926-1927 there were no interruptions, except one morning when a stalled truck blocked the highway.

A passenger conductor holding a trainman's assignment on the Bristol branch drove the first bus on this line, rather than leave home to exercise his seniority rights. Under his management, the highway plowing for 1925-1926 was handled successfully, and he was later made an inspector and is now superintendent of one of the bus-operating divisions. During the winter of 1926-1927, the man actually on the job on this line has been a locomotive man of the Boston & Maine, and credit is due him for watching road conditions carefully and keeping the route open at all times for bus service.

What has been said of the Bristol branch applies, in a general way, to other branches where bus service has completely displaced the rail service, although each line has its own peculiar problems.

On the York Harbor & Beach Railroad, a 12-mile branch connecting with the main line at Portsmouth, N. H., the cost of train service was $1.56 per mile, a relatively high unit cost because of mixed train operations, whereas the bus service for 1926 on this line cost 29.5 cents per mile. The traffic problem here was quite different from that on the Bristol branch. During the summer months, York Beach traffic requires from six to eight buses to handle peak loads. These cars are dispatched as soon as filled to capacity and in this way there has been no difficulty in handling the passengers previously cared for by rail services, which in some cases ran as high as 150 passengers on certain week-end and holiday trains.

Baggage Provisions

The handling of baggage on this line was somewhat of a problem. Contracts were made with local truckmen, the Putnam's Express Company of York Harbor, and F. Ellis of York Beach, to open an office at Portsmouth station where incoming passengers could deposit checks and make arrangements for delivery of trunks for $1 each and suitcases for 50 cents each. These local truckmen also handled express matter to and from Portsmouth station, as the American Railway Express Company discontinued its office at York Beach when the passenger rail service ceased.

To further improve the handling of baggage for 1927, tariffs have been issued and arrangements made for the local transfer companies to have prepaid delivery checks. Thus incoming passengers may now check their baggage through to destination upon prepayment of $1 per trunk and 50 cents per suitcase at point of origin. Likewise outgoing passengers, upon presentation of rail transportation from Portsmouth, N. H., may have baggage checked through via the local transfer companies from York Beach or York Harbor to destination. In other

words, this system of handling baggage will require no more attention on the part of passengers than when rail service went through, although there will be a slightly increased expense for the local transfer. When authority was granted for the complete abandonment of this branch line mention was made that passenger traffic was now handled via the highway.

Another branch line where complete substitution was made was on the Easthampton Branch between Easthampton, Mass., and Mt. Tom, connecting with the main line of the Connecticut River division at Mt. Tom, 16 miles north of Springfield, Mass. Here the rail service cost $2.02 per mile, with the bus service costing us so far 26.4 cents per mile. This unit cost will be somewhat higher when complete overhaul of the car assigned to this run is made. On account of an uneconomical run for the train and engine crew, the unit cost of rail service was about 70 cents higher than the average cost.

Partial Substitution on Branch Lines

On three branch lines partial substitution of rail service has been made, of which two are summer operations only. On the Keene branch, which connects with the main line at Nashua, N. H., bus service replaced some trains with light traffic and, through more frequent service to the more important towns, was the means of the railroad combining other trains and avoiding some duplication in the rail service, even in the territory beyond the limits of the bus line.

On this branch line, 17,528 train miles per year were discontinued and 34,069 bus miles provided. In this case the cost of train service was $1.01 per mile, and the highway service, for the eight months during which it was in operation in 1926, cost 28.1 cents per mile. The average revenue received on the buses on this line was 31.6 cents per mile.

There are some trips on this route and some on the Franklin and Bristol route where United States mail is handled under contract with the government. The revenue received from handling mail is somewhat higher than when handled on the railway, but is somewhat under bids made by other parties who could not combine the mail service with other work.

Partial Substitution for Main Line Service

Five routes have been established, replacing, in part, the main line service. Two of these were solely to protect the speeding-up program of April, 1926, when practically every train on the Boston & Maine system was given a better schedule by reducing the running time. In some cases the running time was cut more than one hour and in many instances a few minutes. This move on the part of the B. & M. was the subject of rather wide comment in the press. One method of speeding up trains was to eliminate stops which had ceased to be used by passengers or were used only occasionally. On the two summer routes, one between Dover, N. H., and Kennebunk, Me., and the other between Old Orchard, Me., and Scarboro, a few passengers who were inconvenienced because of the speeding-up program were taken care of, and while the lines were unprofitable, they were very helpful in assisting the railroad in putting across the program which improved the service for the majority of pasengers.

The other two routes were established where train service was operated out of the larger terminals for 30 or 40 miles, and where the last 15 miles had become unprofitable. One route between Lowell, Mass., and Nashua, N. H., replaced a main line service and, by turning the passenger train at Lowell, 14 miles short of its former destination, a worthwhile saving was made to the railroad, and a few passengers, practically never more than a busload, were delivered in most cases nearer their homes, and in practically all cases not over 10 or 12 minutes later than previously when discharged at the railroad station.

One of the B. & M. Yellow Buses Equipped with Brown Bodies

Substitution for Electric Railway Service

As already stated the first service to be established by the Boston & Maine Transportation Company was at Portsmouth, N. H., where three routes replaced a trolley service owned by the railroad which had shown red figures for several years. Three other routes have replaced electric lines in which the railroad had no financial interest.

The Exeter, Hampton and Amesbury Street Railway Company discontinued service between Exeter, N. H.,

and Hampton Beach, early in 1926. Boston & Maine bus service started on this line in April, 1926. The nearest station to Hampton Beach, which is the largest and most popular beach resort in the State of New Hampshire, is Hampton, four miles away, and the Boston & Maine bus service provides close connection with the rail service, thus attracting beach passenger travel to the trains. During the summer months, the revenue of this line more than met costs. Without the summer travel, the winter operation has shown a loss and it may be necessary to discontinue service except during the summer months.

The Manchester Traction, Power & Light Company discontinued its electric railway service between Manchester, N. H., and Derry, on August 31, 1926, and the B. & M. bus service was established the next day. Two White 50B chasses and 29 passenger Brown bodies were assigned to this run. The fares were slightly higher than the former electric railway rate, and the first four months of bus service on this line produced a revenue of 24.3 cents per mile with an operating cost of 21.8 cents per mile.

The Fitchburg & Leominster Street Railway discontinued service between Ayer, Mass., and North Leominster, serving the towns of Ayer, Shirley, Lunenburg and North Leominster, on December 31, 1926. The following day two X-type 21 passenger Yellow coaches furnished hourly service under the jurisdiction of the Boston & Maine, but under a contract for the Fitchburg & Leominster Street Railway Company. Later this service was cut to a less frequent schedule. Here is a line that in itself is not particularly valuable to the railroad, although it has real possibilities during the training season at Camp Devens. This bus route crosses the main line of the Fitchburg division of the Boston & Maine five times in nine miles and should be useful in coordinating highway and railway service in this territory in the future. The revenue is slightly less than the cost.

Supplementing Rail Service

On five routes the highway service supplements the rail service and travelers are urged, "Railway or High way, use the Boston & Maine way." These routes are from Boston, Mass., to the White Mountains; Boston to Nashua, N. H., and Manchester; Boston to Portland, Me.; Dover, N. H., to Durham; and Ashburnham, Mass., to Fitchburg. The summer service to the White Mountains is covered with Y-type Yellow coaches, the northbound trip going via Portsmouth, Rochester, North Conway, Crawford Notch, Bretton Woods and Twin Mountain to Bethlehem. Southbound the route is via Twin Mountain, Bretton Woods, Profile, Lincoln, Plymouth, the Lake Winnipesaukee region, Concord, Manchester and Lowell. This gives passengers the opportunity to see the two most popular routes to the White Mountains and was an experiment to find out just how such service would be received. Although the operations were restricted to interstate passengers, the line was profitable and it is hoped this coming summer to develop much new business on the mountain route. All seats are reserved on this line, the space being held at Boston and Bethlehem.

Very limited service was given by the Boston & Maine buses on the Boston-Manchester line during the winter of 1925-1926. Commencing in May, 1926, service was increased and rates established slightly below the rail rates in order to meet a competing bus company. Revenue increased each month and in September, 1926, the competing company, The Interstate Stage Lines, Inc., sold its equipment to the Boston & Maine. The Transportation Company still furnishes service at a rate slightly below the rail fare. In the spring of 1926, authority was requested from the New Hampshire Public Service Commission to handle intrastate traffic over part of the Boston-Manchester route, but the application was denied. After the bus service had been in operation for a short time, the people along the line asked that intrastate passengers be allowed to use the service which was passing their doors, and the Public Service Commission reversed its former decision. With this exception, all traffic on the Boston-Manchester lines is intrastate, although other communities along this line are now asking that intrastate passengers be accepted.

At Nashua, a city of 35,000 people, the Boston & Maine had two railroad stations on the main street, neither of which was over five minutes' walk from the business center, yet it was soon found that these would never be as satisfactory for bus waiting rooms as a place in the very heart of the business district. Ten people are received at the terminal established in the center of the business section to one picked up at the railroad station. Interstate service between Boston and Portland, Me., has been furnished for two seasons. The first year the fare charged was $4, which was eight cents higher than the rail fare. During the season of 1926 a fare of 17 cents below the rail fare was used to meet the rates of two competing lines. Two trips in each direction are run except for short periods at the beginning and close of the season when the service is cut to one trip each way. Seats are numbered and sold from diagrams just as Pullman space is handled.

Bus activities on the B. & M. have only started, and as local passenger travel decreases with the increase in the number of automobiles, more branch line service will be

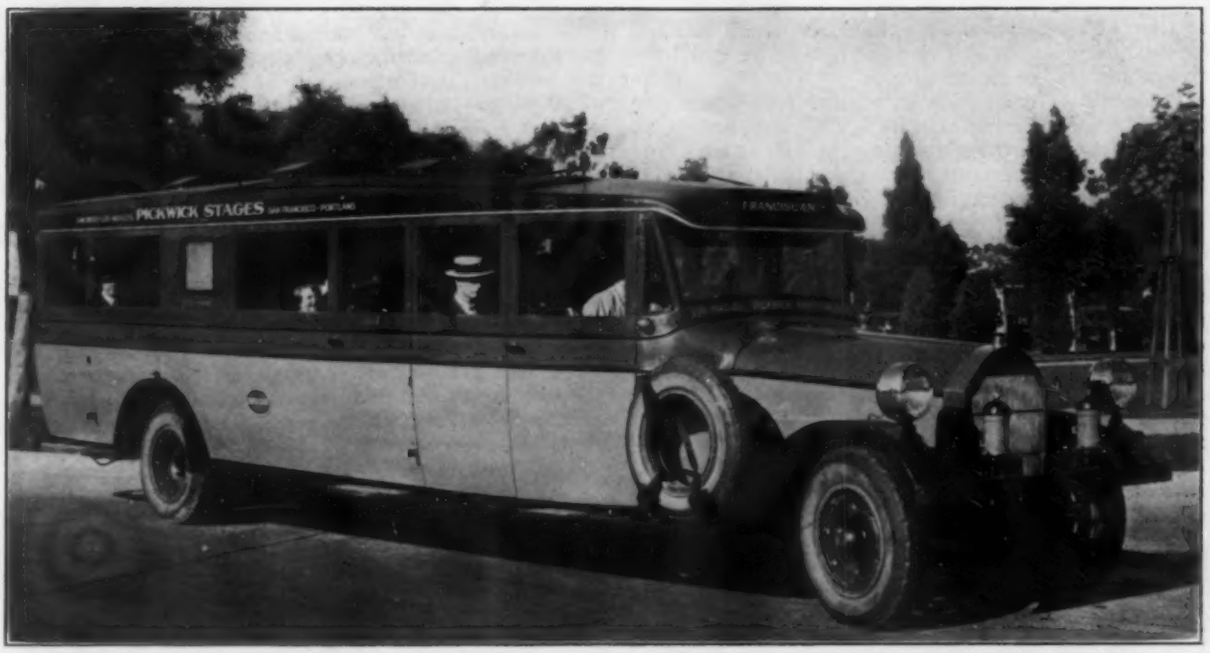
The Franklin-Bristol Bus at Bristol, N. H.

replaced with this newer form of transportation. Whenever or wherever there is a real demand for bus service in B. & M. territory, the B. & M. Transportation Company is ready to provide it and will protest vigorously if operators other than those utilities now serving this part of New England attempt to "grab" the highway passenger business.

B. & M. operating costs for 1926 were as follows:

Operating Costs

Total miles operated		1,010,744
Expenses (operating)		Per mile
Wages of operators	$46,232.06	$0.04574
Bus repairs, cleaning, etc.	37,386.28	0.03699
Tires and tubes	16,784.20	0.01660
Gas, oil and grease	33,790.37	0.03343
Garage expense and storage	20,982.62	0.02076
Lighting, fuel, etc.	3,115.25	0.00308
Registration and permits	12,782.93	0.01265
Superintendence	27,757.45	0.02746
Insurance, property damage	13,050.55	0.01291
Depreciation and rental of equipment	60,166.86	0.03952
Outside ticket agents and advertising	12,821.49	0.01269
General and miscellaneous	7,292.35	0.00721
Snow removal and repairs to equipment	520.26	0.00051
	$292,682.67	$0.28955



Buses are Heavily Taxed in Some States

The Taxes Buses and Trucks Pay

Substantial amounts charged in most states in form of regular or special assessments and license fees

OPERATORS of buses and trucks pay substantial sums in general and special taxes and in license fees in return for their use of the highways, according to a report on special taxation for motor vehicles prepared by the Motor Vehicle Conference Committee. This report, which summarizes state taxes and fees affecting motor vehicle operations in force on January 1, 1927, shows the amounts paid by bus and truck operators in license fees, operators' fees and fuel taxes.

According to this report, motor vehicles are taxed as personal property in all states except Delaware, Idaho, Iowa, Michigan, Minnesota, New Hampshire, New York, South Dakota, Oklahoma, Oregon, Pennsylvania, and Vermont. In these states, the law contains no provision on this subject.

The special taxes and license fees applying to buses and trucks operated for hire, and their operators in the various states were as follows on January 1, according to the Motor Vehicle Conference Committee's report.

Digest of Taxes and Fees Applying to Buses and Trucks

Alabama.—Buses with a capacity of 10 or more passengers, operating between cities or towns 10 miles or more apart pay a license fee of $60. These fees are in lieu of regular registration fees. Trucks are taxed according to their ton capacity, the fees ranging from $15 for trucks under one ton to $1,000 for trucks of seven tons or over. Tractors pay a flat rate of $100 each and trailers are taxed 50 per cent of the amount charged the vehicle drawing it. Operators pay a $5 fee, and the fuel tax is 2 cents per gallon.

Arizona.—A fee of ½ mill per passenger capacity mile is charged against buses, and a fee of 2 mills per ton capacity mile is charged against trucks. The operator's fee is $5, and the fuel tax is 3 cents per gallon.

Arkansas.—In addition to the regular registration fees, a special fee of $2.50 for each passenger-carrying capacity is charged against buses, while trucks are charged one and one-half times the amount charged against trucks privately operated. The charges for these trucks range from $17.50 for trucks of less than one-ton capacity, to $400 for trucks of a six-tons capacity, these rates applying to trucks with pneumatic tires. Trucks equipped with two or more solid tires are charged one and one-half times the pneumatic-tired trucks schedule. Tractors pay a fee varying from $15 for tractors of two-ton or less capacity to $50 for tractors of five-ton capacity. The operator's fee is $5 per year, the gasoline tax is 4 cents per gallon, and the oil tax, 10 cents per gallon.

California Taxes Receipts

California.—Buses pay a tax of 4¼ per cent of their gross receipts in lieu of any and all state, county, or municipal taxes or licenses, except special municipal privilege taxes and the gas tax. Trucks are taxed 5 per cent of the gross receipts in lieu of other taxes, likewise. The operator's fee is $2 per year and the gasoline tax, 2 cents per gallon.

Colorado.—In addition to the regular fees, buses are taxed $20 when their seating capacity is nine passengers or less, and $1 for each additional seat. Trucks are taxed on a sliding scale, ranging from $10 for a one-ton truck to $50 for trucks with capacities between four and

five tons. For each additional ton over five, a $25 tax is levied. The operators pay a fee of $2 a year and the gasoline tax is 2 cents per gallon.

Connecticut.—In addition to regular fees, buses pay $15 each if their seating capacity is 7 persons or less, $2 per seat in addition if their seating capacity is from 8 to 20 passengers, $5 per seat extra for capacities from 21 to 40, and $10 per seat for capacities over 40. In addition, a tax of 3 per cent of gross receipts on carriers operating between fixed termini entirely within the state is levied; if one or both termini are outside the state a fee of 1 cent per mile traveled within the state is charged. Trucks pay fees ranging from $15 to $250, according to their capacity, and trucks with capacities of over 6 tons are charged $100 for each additional ton or fraction thereof. Trailers pay the same fee as trucks. The operator's fee is $5 and the gasoline tax is 2 cents per gallon.

Delaware.—The state law does not provide for taxation of motor buses, but trucks pay a fee of $2 per 500 lb., gross weight, measured by the maximum load capacity, plus the weight of the vehicle, a similar fee being charged trailers. The operators fee is $3 per year and the gasoline tax is 2 cents per gallon.

Florida.—For buses with seating capacities of over 16 passengers a fee of $1.50 per 100 lb. is charged, plus $15 for each passenger seat. Trucks are charged fees ranging from 75 cents to $2 per 100 lb., varying in accordance with capacity and whether or not they are fitted with pneumatic or solid tires. Similar fees are charged to trailers. The operator's fee is $2 per year and the gasoline tax, 4 cents per gallon.

Georgia.—A special registration fee of $75 is charged buses, and trucks pay fees ranging from $15 for trucks of one ton or less capacity to $1,125 for trucks of over seven tons capacity. The operator's fee is $2 per year and the gasoline tax is 3½ cents per gallon.

Idaho.—Buses pay a fee of 5 per cent of their gross revenues, payable monthly, and the same fee is charged to trucks. The operator's fee is $2 per year and the gasoline tax, 3 cents per gallon.

Illinois Has No Gas Tax

Illinois.—In addition to the regular fees buses pay a special fee of $1 per 100 lb. of gross weight, allowing 125 lb. per passenger. Trucks pay in addition to the regular fees a special fee of $1 per 100 lb. of gross weight. The operator's license fee is $5 for the first year and $3 per year for renewal. Illinois does not have a gasoline tax.

Indiana.—Buses are charged a fee of $6 per person at the rated capacity allowing 16 in. per seat. If these are operated exclusively in interstate commerce, fees of $10 per passenger are charged on the same basis. Trucks pay fees ranging from $6 to $200, depending on capacity, and tractors pay a flat rate of $25. Trailers pay fees ranging from $3 to $50, and semi-trailers, fees of from $10 to $125. The operator's fee is $1 and the gasoline tax, 3 cents per gallon.

Iowa.—In addition to the regular registration and license fees, buses pay ¼ cent per ton mile if equipped with pneumatic tires. In this case a ton mile equals the maximum seat capacity at 150 lb. per passenger plus the weight of the vehicle, times the number of miles traveled. The sum thus obtained to be divided by 2,000. Trucks pay the same fee as buses, a ton mile equaling the maximum freight carrying capacity, plus the weight of the vehicle, times the number of miles operated, the sum thus obtained to be divided by 2,000. The operator's fee is $2 per year and the gasoline tax is 2 cents per gallon.

Kansas.—In addition to regular registration fees and other taxes, buses pay special fees ranging from $40 to $230 depending on their capacity, while trucks pay special fees ranging from $40 to $200. Trailers pay a fee of 20 per cent of that charged the drawing vehicle. No operator's fee is charged but a gasoline tax of 2 cents per gallon is levied.

Kentucky.—In addition to regular fees, buses pay $2.50 per passenger if operated over irregular routes and not between fixed termini, and if operated over regular routes, $1 per 100 lb. gross weight, plus special fees of $10 to $15 per passenger seat depending upon total capacity and plus $25 to $50 for bus tags. Trucks pay fees ranging from $20 to $300, the latter applying to the five-ton trucks, and trucks with capacities of more than five tons are charged $30 for each additional ton over five. Bus drivers pay a fee of $12.50 per year and truck drivers, $2 per year. The gasoline tax is 5 cents per gallon.

Louisiana.—Buses pay a fee of 68 cents per horsepower, plus $5 per passenger for buses up to 29-passenger capacity and $6 per passenger for buses seating more than 29. Trucks pay fees of 68 cents per horsepower, plus fees for each 1,000 lb. capacity ranging from $10 to $150, according to size. Trucks with a capacity of more than 10,000 lb. pay $150 for each 1,000 lb. in excess of five tons. Tractors and trailers pay the same fee as trucks, except that they pay no horsepower tax. The operator's license fee is $5 per year and the gasoline tax is 2 cents per gallon.

Maine.—Buses pay a fee twice that of regular fees, while trucks pay fees ranging from $10 to $100 depending on their capacity, if they are equipped with pneumatic tires, and 33⅓ per cent more if equipped with solid tires. Tractors pay a fee of 25 cents per horsepower plus a 25 cents fee per 100-lb. capacity, if equipped with pneumatic tires, and 50 cents if equipped with solid tires. Trailers pay a fee of 15 cents to 40 cents per 100 lb., depending on their tire equipment. The operator's fee is $5 per year and the gasoline tax is 3 cents per gallon.

Maryland Taxes Capacity Miles Operated

Maryland.—Buses weighing 3,000 lb. or less pay 1/20 cent per passenger seat, times the number of miles traveled; buses weighing over 3,000 lb., but less than 8,500 lb., if equipped with pneumatic tires, pay 1/18 cent per passenger seat times the number of miles traveled; and buses weighing over 8,500 lb., if equipped with pneumatic tires, pay 1/7 cent per passenger seat times the number of miles traveled. Buses not operating on fixed schedules pay the same rate as privately owned and operated passenger cars. Trucks pay rates of from 1/6 cent to ½ cent per ton mile times the number of miles traveled, depending on their capacity and tire equipment. The operator's fee is $3 per year and the gasoline tax is 2 cents per gallon.

Massachusetts.—Buses pay a fee of $5 per seat capacity while trucks pay fees of 50 cents per 100-lb. capacity. Tractors pay a flat rate of $10, and trailers pay the same fees as trucks. The operator's fee is $2 per year but there is no gasoline tax.

Michigan.—Buses pay $1 for each 100 lb. of weight for each vehicle, in addition to the regular registration fees. Trucks pay rates of from 65 cents to $1.25 per 100 lb., of unladen weight. Tractors pay the same rate as trucks; trailers pay rates of from 50 cents to $1 per 100 lb., unladen weight. The operator's fee is $2 per year and the gasoline tax is 2 cents per gallon.

Minnesota.—Buses pay a fee of 10 per cent of their value, with a minimum fee in the case of buses over 16-passenger capacity of $350, the depreciation allowed

being 10 per cent for each year after the first. Trucks pay fees ranging from 2.4 per cent to 10 per cent of their value, depending on the kind of products that they carry. The operator's fee is $1.50 per year with renewals, $1, and the gasoline tax is fixed at 2 cents per gallon.

Mississippi.—Buses pay 10 cents per horsepower, and 40 cents per 100 lb. of gross weight. If their weight is over 2,500 lb. they must pay in each county where they are operating $4 for each passenger carrying capacity. Trucks pay one and half times the regular fee charged against privately owned trucks, these ranging from $10 to $400 in the case of pneumatic-tired trucks. Trucks with cushion or semi-pneumatic tires pay one and a quarter times the pneumatic tires schedule, and trucks equipped with solid tires pay one and a half times this schedule. Trailer fees range from $10 to $50 depending on their capacity. There is no operator's fee but the gasoline tax is 4 cents per gallon.

No Bus Tax in Missouri

Missouri.—No provision is made in the state law for the taxation of buses, but trucks pay fees ranging from $10.50 to $36 per ton capacity. Trucks with capacities of over eight tons pay $15 per ton extra. Trailers pay one-half the truck fee and semi-trailers one-quarter the truck fee. The operator's license costs $3 per year and the gasoline tax is 2 cents per gallon.

Montana.—In addition to the regular fees and taxes, buses pay special fees in accordance with their size and weight which are not to exceed $10 per vehicle, and the same applies to trucks. The operator's fee is $2 per year and the gasoline tax is 3 cents per gallon.

Nebraska.—Buses pay a flat rate of $25 per vehicle plus $7 per passenger carrying capacity, and trucks pay fees ranging from $8 to $15, plus 50 cents per 100 lb. in excess of 4,000 lb. gross weight. Trailers pay $3 if the gross weight is less than 1,000 lb. plus 50 cents per 100 lb. gross weight in excess of that amount. There is no operator's license fee but the gasoline tax is 2 cents per gallon.

Nevada.—Buses pay 4 per cent of their gross earnings, if operated over improved highways, less the regular registration fee. The same fee is charged against trucks. There is no operator's license charge, but the gasoline tax is 4 cents per gallon.

New Hampshire.—Buses pay the same state fees as vehicles privately owned and operated, but local authorities may fix special license fees. The same applies to trucks. The operator's license fee is $5 for the first year and $2 for renewal, and the gasoline tax is 2 cents per gallon.

New Jersey.—Buses pay from $15 to $40 per passenger capacity, plus $2 per seat in the case of buses having capacities of more than 30 passengers. Trucks and trailers pay from $10 to $24 according to their gross weight, plus $3 for each 1,000 lb. over 5,000 lb. gross weight. The operator's fee is $3 per year but there is yet no gasoline tax in effect.

New Mexico.—Buses pay a flat rate of $25, if equipped with pneumatic tires, plus $3 for each passenger carrying capacity. Trucks pay a flat rate of $25 plus 75 cents for each 100-lb. carrying capacity, 25 per cent extra being charged if they are equipped with solid tires. Trailers pay a flat rat of $15 plus 75 cents for each 100-lb. weight carrying capacity, with 25 per cent extra in the case of solid-tired trailers. There is no operator's fee but the gasoline tax is 3 cents per gallon.

New York.—Buses pay fees of from $15 to $67.50, according to seating capacity, with a fee of $2 for each passenger seat over 30-passenger capacity. Trucks with a gross weight of more than two tons pay $8 for each ton or fraction thereof, while trailers pay fees ranging from $5 to $30, according to their gross weight. The driver's license fee is $5 the first year and $2 for renewal. There is no gasoline tax.

North Carolina Gets 6 Per Cent of Gross Receipts

North Carolina.—Buses pay 6 per cent of their gross receipts if operating under a certificate from the Corporation Commission and 50 per cent additional fee over private passenger car fees if not operating under a certificate. Cities and towns may charge $50 per vehicle in lieu of all other city and town fees and licenses in the case of buses not operating under a certificate. The same fees apply to trucks. There is no operator's license fee but the gasoline tax is 4 cents per gallon.

North Dakota.—Buses pay, in addition to regular taxes, $10 per passenger capacity to the Motor Vehicle Department and from $15 to $25 per passenger capacity to the Railroad Commission. Trucks pay fees of from $10 to $250 to the Motor Vehicle Department, depending on their capacity, and fees of $15, plus $2 per ton in excess of three tons, to the Railroad Commission. There is no operator's fee but the gasoline tax is 2 cents per gallon.

Ohio.—Buses pay fees of from $20 to $230, depending on their passenger capacity and whether or not they operate between fixed termini and over regular routes. Similarly, trucks pay from $20 to $200, according to their capacity and the nature of their operation. Vehicles used for both property and passenger transportation simultaneously are charged fees based on either tonnage or passenger capacity, according to the basis yielding the greater revenue to the state. The operator's fee is $3 per year and the gasoline tax, 2 cents per gallon.

Oklahoma.—Buses pay in addition to regular license fees, 1/5 cent per mile on the distance traveled, the mileage to be determined on the basis of the number of trips scheduled per day and on the basis of 30 days per calendar month. The same fee is charged against trucks, and while there is no operator's license fee, the gasoline tax is 3 cents per gallon.

New Oregon Rates in Effect

Oregon.—Buses pay ¾ mill per passenger mile, allowing 20 in. seating space per passenger. The number of miles traveled on unimproved highways may be deducted from the total number of miles. Trucks pay the same fees as private trucks, which range from $35 to $140, and in addition pay 1 mill per ton mile, this being computed by adding the ton capacity to the total tire width and multiplying by the number of miles operated. Combination passenger and freight carriers are charged ¼ mill per passenger mile plus ⅜ mill per ton mile, and 50 cents per inch of total tire width. The operator's license fee is $2 per year, and the gasoline tax is 3 cents per gallon.

Pennsylvania.—Buses pay a fee of $20 per seat on a capacity of five passenger or less with $2 additional for each seat over 6 to 26, and $5 additional for each seat in the case of buses with capacities of 27 passengers or more. Trucks pay fees ranging from $15 to $200, according to weight and tire equipment, and the same fees are charged to tractors. Trailers pay fees of from $2 to $50 according to the chassis weight. The operator's fee is $2.50 for the first year and $1 for renewal, and the gasoline tax is 2 cents per gallon.

Rhode Island.—Buses pay double the rate charged to private passenger cars, which is computed on the basis of horsepower plus pounds of gross weight, and trucks

pay similar taxes. The operator's fee is $2 per year and the gasoline tax, 1 cent per gallon.

South Carolina.—Buses with a gross weight of 1,300 lb. on pneumatic tires pay 1/50 cent per passenger seat times the number of miles traveled annually, allowing 150 lb. per passenger. Trucks operating over a regular routes pay from ⅛ cent to ½ cent per ton mile. while trucks not operating over regular routes pay from $15 to $250, depending on capacity. There is no operator's fee, but the gasoline tax is 5 cents per gallon.

South Dakota.—Buses pay 3 per cent of their gross earnings and the same rate is charged common carrier trucks, if equipped with pneumatic tires. Contract carrier trucks or other trucks required to register with the commission pay $20 to $100 per ton capacity if pneumatic tired and 33⅓ per cent more if equipped with solid tires. There is no operator's fee, but the gasoline tax is 3 cents per gallon.

Tennessee.—Buses pay the same taxes as trucks which are 50 cents per horsepower plus from $15 to $50, depending on capacity, and in addition pay $2 per seat capacity. There is no operator's license fee, but the gasoline tax is 3 cents per gallon.

Texas.—Buses pay the same fees as private passenger cars plus an additional fee of $4 for each passenger capacity. Trucks pay a fee of 17½ cents per horsepower plus fees of from 30 cents to $5 depending on tires and weight. Tractors pay 25 cents to $2 depending on weight, while trailers pay from 30 cents to $5. The operator's fee is $3 per year and the gasoline tax is 1 cent per gallon.

Roads Used Affect Utah Taxes

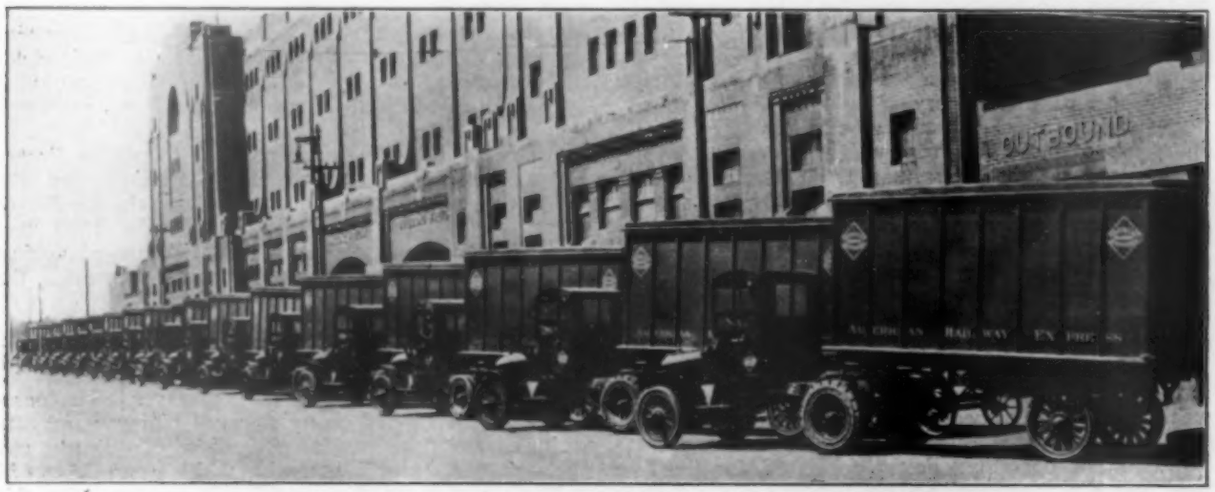
Utah.—Buses pay 2½ mills per passenger mile traveled on hard surfaced highways, and 1 mill per passenger mile traveled on all other highways, the passenger miles being determined by multiplying the actual number of passengers carried by the numbered of miles traveled. Trucks pay ⅔ cents per ton mile operated on hard surfaced highways and¼ cent per ton mile on all other highways. The operator's fee is $2 per year and the gasoline tax is 3½ cents per gallon.

Vermont.—Buses pay $1 per 100 lb. gross weight, allowing 150 lb., to each passenger seat, while trucks pay from 60 cents to 85 cents per 100 lb., depending on capacity. Tractors pay from 90 cents to $1 per 100 lb., and trailers pay a flat rate of $10. The operator's fee is $3 per year and the gasoline tax is 2 cents per gallon.

Virginia.—Buses operating over regular routes pay from 1/50 to 1/40 cent per passenger mile if they weigh less than 8,500 lb., and if they weigh over 8,500 lb., 1/30 cent per passenger mile for one-half the seating capacity and 1/40 cent per passenger mile for the remaining half. Buses operating over irregular routes pay the same rates as the others, except that the number of miles operated must be estimated and a minimum fixed at 20,000 miles. Trucks pay from 1/5 to 3/5 cent per ton mile, depending on capacity and tire equipment, if they are operated over regular routes and if not operated over regular routes, they pay a flat rate of $50 in addition to the regular state license fee for privately operated trucks. The operator's fee is $5 per year and the gasoline tax 4½ cents per gallon.

Washington.—Buses pay from $20 to $25 according to their weight, plus $3 per passenger capacity. They also pay a special fee, sufficient to defray the cost of supervision and regulation, but not to exceed 1 per cent of gross operating revenue, fixed by the Director of Public Works and paid quarterly. Trucks pay $10 for the first 1,500 lb. of weight, plus from 80 cents to $1 per 100 lb. in excess, depending on total weight. These also pay a fee of 1 per cent of gross operating revenue. The operator's fee is $1 and the gasoline tax is 2 cents per gallon.

West Virginia.—Buses operating over regular routes pay 1/15 cent per passenger capacity mile, and buses not operating over regular routes pay a flat rate of $75 annually per vehicle. Trucks operating over regular routes pay from ¼ to ⅓ cent per ton mile, while vehicles not operating on regular routes pay a fee double that of privately operated trucks, from which 25 per cent is deducted if they are equipped with pneumatic tires. Trailers equipped with solid tires pay double the regular trailer fee for those equipped with pneumatic tires, these ranging from $5 for the first ton of capacity plus $7.50 for each additional ton or fraction thereof. The operator's fee is $3 per year and the gasoline tax is 3½ cents per gallon.



There Are Nearly as Many Different Tax Laws as There Are States

Bus Pay Three Times Truck Fees in Wisconsin

Wisconsin.—Buses pay three times the regular rate charged trucks of like gross weight, passengers being rated at 150 lb. each. Interurban buses pay 25 per cent additional. Trucks pay a fee of from $10 to $45, de-

pending on gross weight, up to five tons, plus $5 for each ¼ ton over 5 tons. Tractors pay the same rate and trailers weighing over 3,000 lb. gross pay a fee equal to one-half of the rate on trucks. The operator's fee is $5 per year and the gasoline tax is 2 cents per gallon.

Wyoming and the District of Columbia

Wyoming.—Buses pay the same rate as privately owned passenger cars, which is from $8 to $20 according to horsepower, plus a fee of $1 per passenger seat capacity over seven. Trucks pay from $15 to $150 depending upon their ton capacity. If equipped with other than pneumatic tires on the drive wheels, $10 extra per ton is charged. Trailers with capacity of over 500 lb. pay the same fee as trucks. There is no operator's fee but the gasoline tax is 2½ cents per gallon.

District of Columbia.—Buses pay a flat rate of $12 if their passenger capacity is 10 or more, and trucks pay a flat rate of $1 each. The operator's fee is $2 for three years, and the gasoline tax is 2 cents per gallon.

Street Car Type Bus Mounted on Studebaker Chassis

THE Studebaker "75" heavy duty chassis for the 21-passenger street car type bus has been designed by the Studebaker Corporation of America, South Bend, Ind., for service requiring constant starting and stopping.

The Studebaker big six motor is used as the power plant. It has a positive force feed lubricating system, and the chassis is lubricated by a high pressure system. A specially designed 1½ in. double-set, two range carburetor is used. Current is supplied by a 12-volt generator, accessibly mounted at the right forward end of the engine and by a threaded rubber separator storage battery. The distributor is at the left front of the engine and the entire ignition system is protected against moisture.

A leak-proof, 30-gal. gasoline tank is carried at the rear of the frame, and the fuel is fed to the carburetor through a vacuum tank. A tubular type of radiator, four-blade, 20-in. fan and a circulating pump system cools the motor.

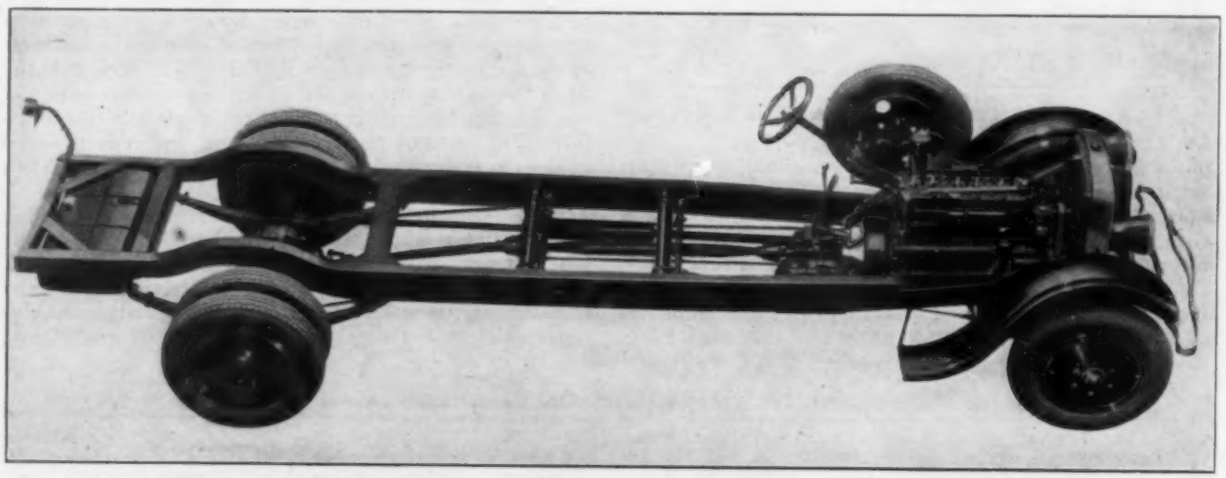
The clutch is of the double-disc, dry-plate type. The transmission which is of the selective type of four speeds forward and one reverse, is in unit with the clutch and engine.

The semi-floating rear axle has extra large chrome-molybdenum shafts, and the drive gear is of the spiral bevel type. The load is carried on large roller bearings at the wheel hubs and the differential. The use of the Hotchkiss drive principle eliminates torque tubes or radius rods. The propeller shaft is a heavy steel tube, 3 in. in diameter, turning through three universal joints and with the angle of drive reduced to a minimum because of the low hung chassis design. The springs are semi-elliptical with 14 leaves in the 36-in. front units and 12 leaves in the 56-in. rear units. Short shackles eliminate side sway. The chassis is swung low to insure safety.

Extra large mechanical, internal expanding four-wheel brakes are used. The brake-drums are 3 in. wide by 17¼ in. in diameter and have three expanding shoes which utilize the speed of the vehicle to increase the braking action. A hand lever controls the emergency brakes, which operate on the rear wheels. The steering gear is of the cam and lever type, especially designed for balloon tires. The deep, rigid pressed-channel steel frame is narrow at the front to allow a short turning radius. The side members, which are 8 in. deep by 3 in. flange width, are secured by nine cross members, of which two are extra large tubular units.

The bus is equipped with 34-in. by 7.50 in. full size balloon tires. Without changing wheels this chassis may be equipped with 32-in. by 6-in. high pressure tires if desired.

The acorn headlights provide two distinct and separate beams of light and are controlled from a convenient switch on the instrument board.



The Studebaker "75" Chassis Was Developed from the Recommendations of Street Car Type Bus Operators

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PLANS are being laid for exhibits at the American Electric Railway Association convention in Cleveland next October to exceed in size those of last year, according to Col. J. H. Alexander, president of the Cleveland Railway Company and chairman of the committee. The convention will be held on October 3-7, although there is a possibility that the exhibits may be opened in advance of the convention, namely, on October 1.

Application blanks for exhibit space will be received from May 16 to June 15 and space assignments will be made on June 22. Record-breaking exhibits are expected in all kinds of equipment, including motor coaches.

Card Index Makes Inspection Scheduling Easy

Northland Transportation Company insures regular examination of bus parts—Other convenient forms used

AN unusual method of scheduling the periodic inspection of buses and their parts and recording repairs made by means of a card index system has been developed on the Northland Transportation Company, the bus operating subsidiary of the Great Northern, by Harold Larsen, master mechanic in charge of the company's repair facilities. By means of this system the possibility of the omission of any scheduled inspection at its regular time is virtually eliminated. The scheme is particularly notable for its simplicity.

Thirteen types of cards, all of card index size, represent the different parts and units of the buses, and each

Form 18 N. L.

BUS No. ..... DATE .....

TAKEN OFF BATTERY No. ..... TEST .....

PUT ON BATTERY No. ..... TEST .....

CONDITION OF BATTERY OR REMARKS

Battery Card Kept for Each Bus

bus in the Northland system is represented by its own set of these cards. As indicated in the accompanying illustrations the cards are numbered from 1 to 13 and each bears, in addition to the bus number, the name of the particular part of that bus that the card represents.

Card No. 1 is for rear wheel bearing and spindles; No. 2 brakes; No. 3, front wheel bearings and front end overhaul; No. 4 driveshaft bearing and driveshaft; No. 5, steering gear and transmission; No. 6, carburetor and clutch; No. 7, differential and radius rods; No. 8, generator and fan; No. 9, motor and main bearings; No. 10, valves; No. 11, starter and magneto-distributor; No. 12, air springs and air pumps; and No. 13, application valve and regulating valve.

Each card is ruled into a number of columns, each column having a heading to indicate the nature of the information to be noted under it. For example, the card representing the brakes has spaces for the notation of the date new lining is put on, for the name of the mechanic applying the lining and the kind of lining applied. Also, the card representing the driveshaft bearing and the driveshaft has space for the notation of the date the part is applied, the name of the mechanic who does the work, the date of the inspection and the name of the inspector. Similar column headings are shown on each card, as indicated in the accompanying illustration.

Cards Filed in Time Order

The inspection cards are arranged in the file in time order by days, so that the inspections to be made on the current day are at the front of the file, those for the next day are immediately behind and the remainder in their daily order. The cards for each day are separated in the file by larger cards marked by red tabs, which bear the date.

Each morning a clerk in the office of the master mechanic removes from the file the cards representing the work to be done on that day. The clerk then notes on a small form printed on yellow paper the number of the bus, the name of the unit and the nature of the work to be done on it. A separate order slip is made out for each operation. This order slip is turned over to the foreman in charge of the garage on that day, who sees that the work is done, returning the order slip upon its completion. From his notations on it the clerk fills in the information required on the index card and it is replaced in the file under the date when the next inspection is to be made.

Inspections are made as follows: Rear wheel bearing and spindles, monthly; brakes, when needed; front wheel bearings and front end overhaul, monthly; driveshaft bearings and driveshaft, monthly; steering gear and transmission, monthly; carburetor and clutch, monthly; differential and radius rods, monthly; generator and fan, monthly; motor and main bearings, every 30,000 miles; valves, weekly; starter and magneto-distributor, monthly; air springs and air pumps, weekly; application valve and regulating valve, weekly.

In the event that repairs to any of the parts become necessary on some day other than the regular inspection day for that part, its card is removed from the file at that time and the nature of the work done is noted on it. The

Form 27 N. L.

Make of Battery ..... Battery No. .....

Type of Battery ..... In Service .....

Bus	On	Off	Pos.	GRAVITY				Neg.	Date	Pos.	GRAVITY				Neg.	Date	Pos.	GRAVITY				Neg.	Date

Battery Record Card Kept for Each Battery

BUS NO. BEARING RW AND SPINDLES NO.
SET UP POS. BY PUT ON BY OLD NEW DRUMS AXLE POS. BY

BUS NO. BRAKES NO. 2
PUT ON BY LINING PUT ON BY LINING PUT ON BY LINING

BUS. NO. BEARINGS F. W FRONT END OVERHAUL NO. 3
SETUP BY PUT ON POS. NO. BY SETUP BY PUT IN ADJ. BY

BUS NO. BEARING D. S. DRIVE SHAFT NO. 4
PUT ON BY INSPECT BY PUT ON BY INSPECT BY

BUS NO. STEERING TRANSMISSION NO. 5
SET UP BY PUT IN BY SET UP BY PUT IN BY

BUS NO. CARBURETOR CLUTCH NO. 6
TESTED BY PUT ON BY OVERHAUL BY BEARING BY

BUS NO. DIFFERENTIAL RADIUS RODS NO. 7
SET UP BY PUT IN BY NEW BY ADJ BY

BUS NO. GENERATOR FAN NO. 8
OVERHAUL BY PUT IN BY OVERHAUL BY PUT IN BY

BUS NO. MOTOR AND MAIN BEARINGS NO. 9
OVERHAUL BY PUT IN BY RINGS RODS BY TAKEN UP NEW BY BLOCK

BUS NO. VALVES GROUND NO. 10
EX. INT. BY EX. INT. BY EX. INT. BY EX. INT. BY

BUS NO. STARTER MAGNETO-DISTRIBUTOR NO. 11
SET UP BY PUT IN BY SET UP BY PUT ON BY

BUS NO. AIR-SPRINGS AIR PUMPS NO. 12
SET UP BY PUT IN BY SET UP BY PUT IN BY

BUS NO. APPLICATION VALVE REGULATING VALVE NO. 13
SET UP BY PUT IN BY SET UP BY PUT IN BY

Record Cards to Cover Accessories and Parts

From 20 N. L.

TAKEN OFF

BUS NO. .....

DATE .....

MECHANIC .....

SET UP

DATE .....

MECHANIC .....

PUT ON

BUS NO. .....

DATE .....

MECHANIC .....

Return this Tag to Stock Room

NAME OF UNIT

DEFECTIVE PARTS

Tag Reports Covering Units

Form 20 NL.

NORTHLAND TRANSPORTATION CO.

BUS REPORT CARD Bus Miles.....

Bus No. ..... Date.....

THIS CARD MUST BE LEFT ON BUS ALL DAY

TIME	NATURE OF DEFECT

Every Opr. and Conductor will enter details as to any apparent defect, if no defect exists, mark O. K. in defects column, also time leaving bus in columns provided.

LOWER PART OF CARD TO BE FILLED IN WHEN BUS IS SERVED

Gallons Gasoline	Quarts Oil	Served By	Crank Case Drained By	Qts. Oil Put In	Served by Service Car By

Driver

Drivers' Bus Report Card

Date .....

UNIT	JOB	BUS

Inspection and Repair Order Slip

dates of inspections are, of course, fixed by the master mechanic so that the work is spread out over the month, and arrangements are made by the operating department to have the buses in the garage at Minneapolis on the days when work is to be done on them.

Other Forms Used

On the Northland, the usual practice of having drivers keep a daily report card upon which to note defects appearing in the bus while in service, is in effect. The form used by the Northland is reproduced herewith. It bears spaces for the number of the bus and the date and for the kinds of defects materializing. If no defect exists the drivers are required to mark "O.K" in the defect column. The card also has space for showing the number of miles the bus has been operated on the particular date, and below are columns for indicating the number of gallons of gasoline and quarts of oil put into the bus, the name of the employee servicing it, the name of the employee who drained the crankcase and the number of quarts of oil put in, and the name of the employee on the service car if it has been required because of a breakdown. These bus report cards are signed by the drivers filling them out. Repair order slips, such as those described above, are made out by the inspectors who examine the defective parts reported by the driver, and repairs are made in accordance with these order slips.

When heavy repairs to units such as the motor are to be made, the unit is removed from the bus and taken to the machine shop where a tag, such as that reproduced, is made out, indicating the kind of unit and the defective parts. This tag is attached to the defective unit and remains on it until repairs have been made and the part has been returned either to a bus or to the stock room. This tag also shows the number of the bus from which the part is taken, the date it is removed and the name of the mechanic removing it. It also shows the date when repairs are made, the date when the part is installed in a bus and the number of the bus. The tag is then filed in the stockroom. Like the inspection card, it is useful in providing a check upon the performance of the various units, since it shows how frequently repairs have been necessary.

Batteries Watched Closely

A particularly close check is kept by the maintenance department of the Northland on the performance of the batteries used in its buses. Two types of report forms are involved in this work. The smaller of these forms, of which there is one for each bus in the fleet, shows the number of the bus it represents, the number of the battery removed for charging or repairs, the number of the battery with which the defective one is replaced, the results of the tests made of the battery taken off and the battery put on, and the date. The card also bears space for the notation of information regarding the battery removed, which is made by the inspector.

The larger card is kept for each battery used by the Northland. This bears the name of the maker of the battery, the number of the battery, its type and the date it is put into service. Below these headings are columns for information which give the entire history of the battery. The first column is for the number of the bus, the second for the date the battery is put on the bus, and the third for the date on which it is taken off. Other columns show the results of tests of the battery, including the dates the tests are made.

Whenever a battery is tested the results of the test are noted on its card and the card is maintained for the battery as long as it is used.

D. & R. G. W. Gets Bus Line Certificate

THE Denver & Rio Grande Western has secured from the Public Utilities Commission of Colorado a certificate permitting the operation of motor buses between Salida, Colo., and Alamosa. Application for this certificate was reported in the Motor Transport Section of February 26. Operations on this line began on April 15.

The buses will be operated by the Denver & Rio Grande Motor Company, a subsidiary of the railway. The order of the commission also authorizes the D. & R. G. W. bus subsidiary to operate between Monte Vista and Salida and between Center and Saguache. The bus line of the D. & R. G. W. will be consolidated over the latter route with that of the San Louis Valley Transportation Company, and the railroad will hold 83 per cent of the stock of the consolidated lines.

Passenger train service on the narrow-gage line of the D. & R. G. W. between Salida and Alamosa was abandoned with the beginning of bus service. Although passenger trains have not been run on this line on Sunday, Sunday service will be provided on the bus line. In its application for permission to abandon passenger service on the railway and to substitute motor buses, the D. & R. G. W. stated that its operating loss on this line has been $40,000 annually.

Secures Injunction Against "Interstate" Operator

AN injunction which is considered to be of far-reaching importance to railways has been secured by the Boston & Maine against a competing bus line. The bus line whose operations are restrained by the injunction is the Farnham-Nelson Company operating between Boston, Mass., and Lawrence. Being unable to secure a certificate from the Department of Public Utilities of Massachusetts which would permit it to operate an intrastate service, the bus line regularly ran its Boston-Lawrence buses through Lawrence to Messer's Crossing, N. H., and then back to Lawrence, while Lawrence-Boston buses ran from Lawrence to Messer's Crossing, back to Lawrence again and thence to Boston. This made the operation an interstate one, not subject to the restraint of the Department of Public Utilities of Massachusetts.

A temporary injunction was secured against this bus line by the Boston & Maine following the presentation of its contention to the federal court that this operation was resorted to merely as a subterfuge for the purpose of evading legitimate police laws of the state of Massachusetts. Richard W. Hall, assistant solicitor of the Boston & Maine, who handled the case for the railway, referred to several decisions of the Supreme Court of the United States in support of his contention that the bus line should not be permitted to hide behind the constitutional provisions relating to interstate commerce simply for the purpose of evading the state laws. Mr. Hall referred, among other cases, to that of Cook versus Marshall county, 196 U. S. 261, in which on page 272 the court said:

"While this court has been alert to protect the rights of non-resident citizens and has felt its duty, not always with the approbation of the state court, to declare the

invalidity of laws throwing obstacles in the way of free inter-communication between the states, it will not lend its sanction to those who deliberately plan to debauch the public conscience and set at naught the laws of a state. The power of Congress to regulate commerce is undoubtedly a beneficient one. The police laws of the state are equally so and it is our duty to harmonize them. Undoubtedly a law may sometimes be successfully legally avoided, if not evaded, but it behooves who stakes his case upon the letter of the constitution not to be wholly oblivious of its spirit."

The Farnham-Nelson Company, which had previously operated eight round trips daily between Boston and Lawrence, discontinued service on March 19, following the granting of the injunction.

Two New England Roads Report on Highway Activities

THE annual reports of the New York, New Haven & Hartford and the Boston & Maine for 1926 make brief mention of the highway subsidiaries of those companies, i. e., the New England Transportation Company and the Boston & Maine Transportation Company respectively. In addition the New Haven report publishes the income account and balance sheet of the N. E. T. Company.

"Truck competition," says the Boston & Maine report, "continues to reduce local traffic. The principal cause is rates lower than the railroad can economically charge. To regain this lost traffic the railroad must greatly improve service. Store-door delivery is slowly gaining. Freight container service was started during the year between Boston and Worcester and Boston and Springfield. The results are promising. The railroad is in the business of providing transportation—not exclusively rail transportation. If the convenience of shippers requires service by truck, the railroad should provide it. If store-door delivery is advantageous, the railroad should see that its customers have it. The traffic lost to the trucks will be regained only by the railroad aggressively providing a service which will meet the needs of all.

"Bus competition is somewhat less than a year ago. The regulating commissions of the New England states have shown an inclination to protect the railways in business rightfully theirs. The motor bus is rapidly finding a field as an auxiliary to railway passenger service.

"The capital stock of this company, (i. e., the Boston & Maine Transportation Company) is owned by the Boston & Maine Railroad. During the year the gross earnings from buses and trucks were $439,000. The operation of buses by the railway is giving the public improved service and has saved the railway some expense. The general plowing of highways in winter has made possible the operation of trucks and buses all-year round."

The New England Transportation Company now operates on its maximum schedule 43 routes over 1,000 miles of highway, utilizing 184 motor coaches, says the New Haven report. "During the winter months this is reduced to 35 routes operating over 925 road miles. The coach mileage for the year 1926 was 4,608,245, and the total number of passengers carried was 2,837,495.

"In the development of this highway subsidiary the policies as laid down at its inception have been closely adhered to. The results show that real benefits accrue to rail service from the co-ordination of the highway lines with train schedules. The program has proceeded conservatively, after close and careful study, and few if any more lines remain to be installed."

New England Transportation Company

COMBINED INCOME ACCOUNT

	Year 1926	Comparison with 1925 Increase or *Decrease*
Operating Revenues:		
Passenger	$1,380,456.67	$1,265,914.79
Other	79,931.19	74,848.70
Total	1,460,387.86	1,340,763.49
Operating Expenses:		
Maintenance of Way and Structures	5,012.97	1,855.98
Maintenance of Equipment	517,543.59	465,610.63
Transportation	696,705.67	620,090.19
Other	247,721.48	218,325.84
Total	1,466,983.71	1,305,882.64
Net Operating Revenue	†6,595.85	34,880.85
Tax Accruals	49,068.87	44,687.62
Operating Income	†55,664.72	9,806.77
Non-Operating Income	23,804.68	23,274.99
Gross Income	†31,860.04	13,468.22
Deductions from Gross Income	45,354.73	45,163.62
Net Income	†$77,214.77	$31,695.40

†Deficit.
Decreases in italics.

The Operating Expenses were 100.45% of the Total Operating Revenues.

The N. Y., N. H. & H. R. R. Co. owns the entire issue of capital stock and its investment in this Company is as follows:

	Par Value	Book Value
Stock	$1,450,000.00	$1,450,000.00

New England Transportation Company

Balance Sheet, December 31, 1926

ASSETS	1926	Comparison with 1925 Increase or *Decrease*
Investments:		
Investment in Real Property and Equipment	$1,533,706.34	$1,010,004.71
Other Investments	632,453.02	266,479.97
Total Investments	2,166,159.36	1,276,484.68
Current Assets:		
Cash	19,760.68	*62,932.79*
Net Balances due from Agents and Operators	28,466.33	21,890.33
Miscellaneous Accounts Receivable	52,826.27	39,709.86
Materials and Supplies	30,201.74	22,964.22
Total Current Assets	131,255.02	21,631.62
Deferred Assets	1,100.00	900.00
Unadjusted Debits	60,973.52	45,904.95
Total Assets	$2,359,487.90	$1,344,921.25

LIABILITIES		
Capital Stock	$1,450,000.00	$885,000.00
Current Liabilities:		
Equipment Notes Payable	544,355.83	544,355.83
Miscellaneous Accounts Payable	114,334.71	*213,736.05*
Accrued Interest	2,249.06	2,249.06
Total Current Liabilities	660,939.60	332,868.84
Deferred Liabilities	80,000.00	*82,402.79*
Unadjusted Credits:		
Operating Reserves	6,568.62	6,568.62
Accrued Depreciation—Equipment	247,271.80	224,558.19
Accrued Depreciation—Other	7,289.94	7,205.30
Other Unadjusted Credits	53,158.41	49,493.57
Total Unadjusted Credits	314,288.77	287,825.68
Profit and Loss—Balance	†145,740.47	*78,370.48*
Total Liabilities	$2,359,487.90	$1,344,921.25

†Deficit.
Decreases in italics.

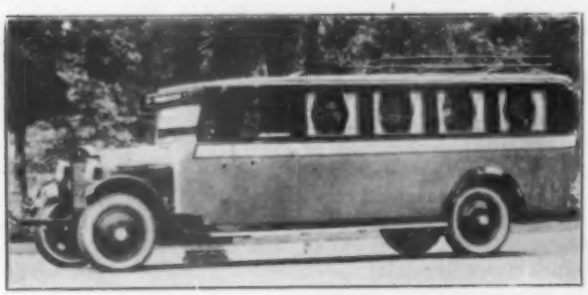
The Boston & Maine Uses Buses of Various Sizes

Both Large and Small Buses Favored

Officers in charge of railway bus operations tell conditions demanding each size

ONE of the first questions to be decided before beginning the operation of a bus line is whether buses of large, medium-size or small capacity shall be used. In the earlier days of bus operation, this matter was left largely to chance, with the result that pioneer bus operators frequently adopted equipment ill suited to the needs of their lines and suffered considerable losses as a result.

Sufficient experience has now been gained by a number of bus operators, however, to enable sound conclusions on this question to be reached. To ascertain the experience and viewpoints of practical railway bus operators, several questions were addressed to a number of the officers in charge of such operations. These questions



The Small Bus Fills a Specific Need

were as follows: Do you favor the large bus, the medium-sized bus, or the small bus, and why? What conditions have you found require large buses? What conditions require medium-size or small buses What sizes of buses do you operate?

In general the replies to these questions indicate that railway bus operators have found the large bus best suited to their requirements in general, although the point is clearly made that circumstances frequently render the operation of small buses more desirable.

Conclusions of Railway Bus Operators

The conclusions of the officers whose opinions on this subject were sought are given below:

D. C. Douglass, managing director of the SamOset Company, the bus-operating subsidiary of the Maine Central, believes that the question of the size of bus to be used depends entirely on the character of service to be rendered and the territory served. He has found that during the tourist season in the Maine Central territory, the small bus will not care for the business without carrying too heavy an investment in many small units. The type of bus used by the SamOset Company is the 29-passenger Fageol parlor car.

F. S. Hobbs, manager of the New England Transportation Company, the bus-operating subsidiary of the New York, New Haven & Hartford, says that as a general proposition his company favors the large bus. "Our service at the present time calls for about 95 per cent large seating capacity buses and possibly 5 per cent small seating capacity buses," Mr. Hobbs states. "Upon the assignment of the bus of proper seating capacity depends largely the cost and the net revenue per mile."

The experience of the New England Transportation Company has been that large buses are required on the heavy through routes offering 25 to 30 passengers per schedule, while medium-size or small buses are required on routes where the peak loads are 20 passengers or less. The New England Company operates buses with seating capacities of 25, 27, 29, 30 and 33 seats.

Large Field for Big Bus

The views of R. J. Littlefield, manager of the Boston & Maine Transportation Company, the bus-operating subsidiary of the Boston & Maine, are given in the following:

"From the viewpoint of a railroad operating man, I believe there is a large field for the big bus. This applies especially where railroad companies replace passenger rail service with highway transportation. If any appreciable amount of express matter, mail, milk, or baggage is to be handled on the bus, the largest bus made which can be operated in the New England states in accordance with the laws is desirable. In practically every case where bus substitution for rail service has been accomplished we use 29-passenger cars, and if the highway conditions and motor vehicle and other laws regulating the use of buses permitted, we would like to assign still larger cars to some of these routes.

"Certain operating costs are based on the number of units, regardless of size, which have a tendency to increase the cost of operating two small buses somewhat out of proportion to the cost of a large car. Some of

these items are garage storage, insurance, tires, operators' wages, etc.

"On one branch line before all passenger rail service was replaced with bus service, it was not uncommon for a week-end or a holiday train to handle over 100 passengers, and 29-passenger cars operated on a frequent schedule now allow us to take care of the travel without delay.

"On routes known as feeder lines, not supplanting rail service, there is a place for the lighter cars. This especially applies where the schedule is more frequent than on routes replacing the steam service. If three or four routes with frequent service centering at one point can be handled with the medium-sized car, with double headers necessary only morning and night, the operating and mechanical forces can be so arranged that the maximum number of drivers will be available for the peak loads, and the total cost of operation will be below the costs when only larger units are used. There are many things to be considered in determining whether or not routes should be covered with the largest cars or medium-sized cars, such as conditions of the roads, frequency of schedule, and the potential patronage.

"On one feeder route where the patronage was very thin, yet where it was necessary to continue the service morning and night, the operating loss was reduced from $300 to less than $100 per month by assigning a 16-passenger car and selecting one of the commuters, qualifying him as a driver, and paying him on a part-time basis to operate the car.

"The demand for buses for special party work is growing rapidly, and in nearly every case something larger than a 20-passenger car is required. I think it is safe to say that where a 20-passenger car meets the demand for a special party there are nine cases where a larger car is wanted. Before the bus business is many years older, 40-passenger cars will be available."

Opportunities for Smaller Buses

"It is hard to conceive of a steam railroad operating a medium-sized fleet without finding several opportunities where the smaller units can be utilized to good advantage, just the same as on the railroad there is a certain demand for the smaller type of locomotives. One condition which makes it necessary for an operator to have a certain number of smaller cars is the restriction on heavy buses placed by the various states during the spring of the year when the frost is coming out of the ground. In the state of Maine no motor vehicle of any description weighing more than six tons loaded is permitted on the highway; and in the state of New Hampshire seven tons is permitted on two or three trunk lines, with the six-ton limit on all other state or state-aid roads."

The Boston & Maine Transportation Company operates 25 Yellow buses of 29-passenger capacity; 18 White buses which have a capacity of 29, except when the baggage compartments are in use, when the capacity is 24 passengers; 5 White buses of 25-passenger capacity; 3 Yellow buses of 21-passenger capacity; 3 Brockway buses of 21-passenger capacity; 1 Reo bus of 21-passenger capacity; and 1 Studebaker bus of 16-passenger capacity.

N. C. & St. L. Uses Large Buses

The Nashville, Chattanooga & St. Louis Motor Transit Company, the bus-operating subsidiary of the N. C. & St. L., uses buses of 29-passenger capacity on its line paralleling the Tracy City branch of the railway, pas-

Charter Parties Usually Require Large Buses

senger service on which has been replaced by bus service. According to F. W. Kelsey, superintendent of the Chattanooga division, who is in charge of this bus operation, a survey indicated that the bus with 29-passenger capacity would be required to accommodate passengers that were being handled on the railway trains at the time the replacement of train service by bus service was made. The N. C. & St. L. uses buses only for the transportation of passengers, operating specially designed trucks to handle mail, baggage and express. The N. C. & St. L. has three Yellow buses of 29-passenger capacity and two mail, baggage and express vehicles, of which only one bus and only one truck are required regularly to meet the schedules. The other baggage truck and two buses are held for reserve and overflow business.

"On the line of this service," says Mr. Kelsey, "there are three schools and two summer resorts. Therefore, very close supervision has to be maintained in order to provide accommodations for the different peak movements and this also compels us to provide one more unit of passenger equipment than the regular service requires."

Alton Uses Buses of Varying Sizes

The Alton Transportation Company, the bus-operating subsidiary of the Chicago & Alton, has buses of widely varying sizes in its service. With its present disconnected service covering one line between Jacksonville, Ill., and St. Louis, Mo., another between Joliet, Ill., and Wilmington, and a third between Pontiac and Blooming-

ton, the Alton is operating four gas-electric coaches seating 35 passengers each, two gas coaches seating 24-passengers each, all of these being Versare coaches, two Yellow buses of 29-passenger capacity and two Reo buses of 18 and 21-passenger capacity. These latter are being overhauled and will be used for special or emergency service.

"To meet the various conditions," says X. H. Cornell, vice-president and general manager of the Alton Transportation Company, "there must be varying sizes of buses: Large buses for intercity morning and evening mass travel and smaller buses for hours of lighter travel and for more frequent service, or for overflow travel. In rural travel where there are no peak loads I favor the 21 and 25-passenger bus, as the fuel cost and upkeep are less."

Studebaker Bus of Medium Capacity Used by Little River Railroad

Medium Size Buses Favored

A railway officer who is well informed on matters of bus operation through his long study of the subject, but who has asked that his name be withheld because he is not yet actually in direct charge of a bus line, is quoted below:

"Generally speaking, I am inclined to favor medium-size coaches which are large enough to take care of the maximum loads which might be encountered under a reasonably frequent schedule and yet not too large to make their operating costs exorbitant when put against the average loads which may be carried.

"In other words, the medium-size coach will permit a greater frequency of schedule, thus spreading out the loads, and at the same time giving a lower per mile cost than the large coach. I think it very important that as great a frequency of scheduled runs be given as is possible to handle the known traffic demands.

"I do not favor the small bus, because its capacity is reached too quickly and extra trips necessitated. Of course, if the traffic is so slim that the small bus will carry the normal loads with a reasonable frequency of schedule and at the same time give enough space to take care of the ordinary maximum per trip which may be expected, the small bus is the one to use. The same argument can be applied to the large bus, i.e., when average loads are such that they are about the capacity of the medium-size coach or greater, I think the large bus should be used.

Capacity Utilization Rarely Attained

"It is all very well to talk about utilizing capacity on every trip and I understand that that is the economic result which should be obtained, but it is an ideal never attained, and it seems to me that if schedules are properly arranged and the load so distributed that, generally speaking, each coach can take care of a few more passengers than are ordinarily carried per trip, it makes a better and more satisfactory arrangement than to be always faced with the necessity of sending out extra coaches on short notice. Of course, with any operation, some special movement might demand extra coaches anyhow, but generally speaking I do not consider it desirable to have to make use of extra coaches continually to protect runs.

"I think, however, that most operations should, if there is any justification at all for them, have one or more large coaches for use in handling special parties, excursions, etc.

"Of course, after all is said and done, no set rule can be laid down. Each operation should be studied carefully and analyzed and equipment chosen to meet the needs as developed by the study.

"My theory is that coaches should be run as frequently as is economically possible, and that they should be of such size as will take care of the normal load and still have capacity enough to provide seats for a reasonable number of persons above the normal.

"Requirements can not always be foreseen in advance and I know nothing more annoying to passengers than to be told that the coach they hoped to leave on is filled, but another will be provided shortly, or to be told at a station along the route that another coach will be along in a short time to take care of them, or to make them stand."

Northland Expands in Northern Minnesota

FURTHER expansion of the Northland Transportation Company, the bus operating subsidiary of the Great Northern, has been effected by its purchase of the Mesaba Railway Coach Company in Northern Minnesota. The purchase is subject to the approval of the Minnesota Railroad and Warehouse Commission. The new Northland route operates between Hibbing, Chisholm, Virginia, Biwabik and Aurora, a distance of approximately 40 miles. This route parallels the electric line of the Mesaba Railway, which will be abandoned and dismantled this spring.

Acquisition of the new line strengthens the position of the Northland in the Range territory, since it already has a bus line operating from Duluth north through Virginia. It is understood that the buses operating on the new line will be scheduled to connect with the buses on the north and south line out of Duluth.

Application for authority to carry out the transfer of the operating certificate was filed by the Northland with the Railroad and Warehouse Commission following a meeting of representatives of 11 communities served by the new Northland line at Virginia on April 2. Representatives at this meeting voted in favor of recommending to the Railroad and Warehouse Commission that the transfer of the certificate be approved. Hourly service between Hibbing and Gilbert and two-hourly service between Aurora and Virginia was asked in a resolution passed at this meeting. C. E. Wickman, president of the Northland Transportation Company, is reported to have indicated that the service asked for would be furnished. Mr. Wickman is also said to have promised a reduction in the rates of fare which have been charged on this line.

Ten new motor buses have been purchased to augment the fleet already in operation on the line, operation of which by the Northland began on April 16.

Two Tractors and Seven Trailers Are Used.

Wabash Uses Tractors and Trailers

Service expedited between three city stations by substitution for trap car service—Delays reduced from 24 to 72 hours

NOTABLE savings in time in transit on l.c.l. freight handled between four of its stations in Chicago has been effected by the Wabash through the elimination of trap car service and the substitution of tractor and trailer operation. Former delays of from 24 to 72 hours in the transfer of freight between its stations have been eliminated by the motorized service, which insures delivery on the same day as that of the arrival in Chicago of inbound freight and the loading of outbound freight in through package cars on the same day that it is received. The tractors and trailers have been in operation only since March 1, but careful records of performance which have been kept indicate that the tractor and trailer service, in addition to being more speedy, will also be found to be more economical than trap car service.

The tractors and trailers operate between the down-

A Tractor and a Trailer at the Company's Office

town freight station of the Wabash at Polk street in Chicago, the Forty-Ninth street transfer station, which is five miles from Polk street, and the Englewood station, which is seven miles from Polk street. Continuous service throughout the day is maintained between the Polk street outbound freighthouse and the Forty-Ninth street transfer house, the trailers being spotted for loading and unloading at the two houses and the tractors being kept almost continuously on the road for ten hours a day. In addition one trailer is spotted at the Twelfth street inbound freighthouse, leaving that point at 12 noon each day and arriving at Englewood at 12:45 p.m. Another trailer leaves Englewood at 1 p.m. and arrives at Forty-Ninth street at 1:40 p.m. The tractor which hauls these trailers is cut out of its regular run between Polk street and Forty-Ninth street in order to make the one daily trip via Twelfth street and Englewood and cuts in again on its regular schedules upon its arrival at the Forty-Ninth street transfer with the trailer from Englewood.

International and G. M. C. Tractors, Lapeer Semi-Trailers Used

The tractor and trailer operation of the Wabash is carried on for it under contract by the Arthur Dixon Transfer Company, Chicago. The work is contracted for rather than operated directly by the railway on account of the railway's inexperience in truck operation for the handling of freight.

The Arthur Dixon Transfer Company furnishes nine units of equipment for the regular service. This includes one model 74-C chain drive International Harvester tractor truck of 10-ton capacity, a 10-ton "Big Brute" G. M. C. tractor and 7 Lapeer semi-trailers. The tractors are operated by employees of the Arthur Dixon Transfer Company but the loading and unloading of the trailers and their locking and sealing is done by employees of the railway. The trailers are of all-steel construction and are 8 ft. wide, 9 ft. high and 18 ft. long. They are painted "banner blue," the same color as the equipment of the Wabash Banner Blue Limited between Chicago and St. Louis, and bear the familiar Wabash flag insignia and the name "Wabash Railway Company Transfer Service."

R. A. Walton, assistant general freight agent of the Wabash at Chicago, who, with E. Haney, superintendent of the Chicago terminal division, supervised the installation of the tractor and trailer service, has outlined the reasons for the replacement of trap car service and the benefits which are accruing.

"By the new plan," says Mr. Walton, "all merchandise

received at the transfer station in trap cars from industries within the terminal district, or all l.c.l. traffic received in cars from foreign lines, and that arriving via the Wabash requiring transfer, is worked on the day of receipt at the transfer. Two blocks of package cars are laid out daily, one at the Forty-Ninth street transfer station and one at the Polk street station, to all principal points on and beyond the Wabash's rails, and through the use of the tractor-trailer service all shipments are transferred to their respective package cars and leave the same day. This results in increased average loadings and a decrease in the number of road haul cars.

"Previous to the inauguration of this service, hundreds of trap car loadings had to be made each month in accomplishing the transfer of freight between the Forty-Ninth street and Polk street stations, which frequently meant delays of from 24 hours to 72 hours. Complaints because of these delays have been entirely eliminated, for the motor equipment now makes it possible to send out all freight in package cars bound for its destination or break-bulk point the night of the same day received, and also to deliver incoming freight received at the transfer station to either the Polk street or Englewood stations the same day as received. By virtue of the fact that shipments may be quickly concentrated at either the Polk street or the Forty-Ninth street stations by means of the tractor-trucks, the Wabash is also able to provide better service to certain towns and cities not so important as others from a shipping point of view, to which cars of freight by the old plan went out only every other day or so. Cars now usually go out daily to these places.

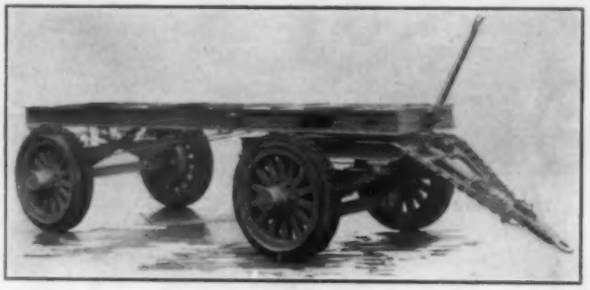
"Receivers and shippers in the Englewood district are being especially benefited by the improvement in service provided by the Wabash since the tractor-trailer equipment was installed. In fact, they can now obtain substantially the same type of service that is available to other districts served by the main freight stations. They receive their freight the same day it arrives over the Wabash in Chicago and have their outbound shipments leave Chicago in through package cars on the same day of shipment. L.c.l. shipments to and from the Englewood station have been particularly expedited since the inauguration of the motor service."

Ewing Galloway

Rail Motor Cars, Species Ford, in Northern Chile

Lapeer Introduces New Four-Wheel Trailer

A NEW four-wheel trailer embodying a roller type fifth wheel, heavy drawbars attached to the outside corners of the forward end of the frame, automatic brakes and safety chains has been placed on the market by the Lapeer Trailer Corporation, Lapeer,

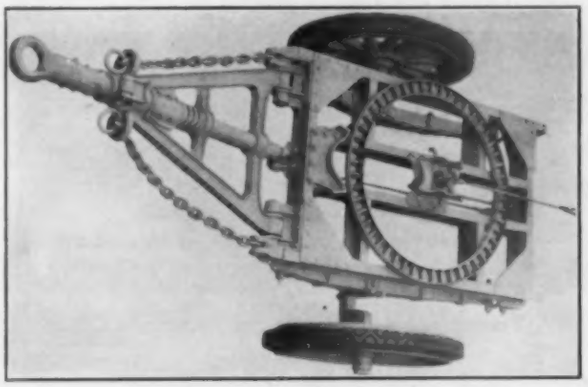


The New Lapeer 4-Wheel Trailer

Mich. The trailer is furnished in various sizes with capacities ranging from 2 to 12 tons and lengths of from 12 ft. to 16 ft., and the various models weigh from 3,000 to 7,000 lb. The trailer has a frame and subframe of channel steel and is equipped with wooden wheels, Timken bearings and internal expanding brakes.

The new roller type fifth wheel has an exceptionally large king pin, and a stop of rugged construction on the front of the frame prevents the front wheels of the trailer from being turned beyond the proper angle. The accompanying photograph shows the method of attaching the drawbar yoke to the outside corners of the trailer frame. The same illustration also illustrates the braking system used. When the trailer overrides the tractor, the drawbar pole is pushed back against the brake lever on the front end of the trailer frame. A hand brake lever is provided so that the brakes on the trailer may be set when it is detached.

State laws require that all four-wheel trailers shall be equipped with safety chains. On Lapeer trailers these



The Lapeer Roller-Type Fifth Wheel

chains are furnished as part of the trailer and pintle hooks, eliminating the necessity of crossing the safety chains in order to turn the truck with relation to the trailer. Each chain is in itself sufficiently strong to pull the load of the trailer, and they are easily connected and disconnected.

White Company Announces Two-Ton High-Speed Truck

THE White Company, Cleveland, Ohio, has just made available an entirely new truck model for service in the two-ton capacity class. This new chassis, known as the White fast express Model 56, is equipped with a new 45-hp. removable head motor; straight line drive, new frame, single reduction axle, new type brakes, unit power plant, new White oiling system and air cleaner. This model is particularly designed for high speed operation over extended periods.

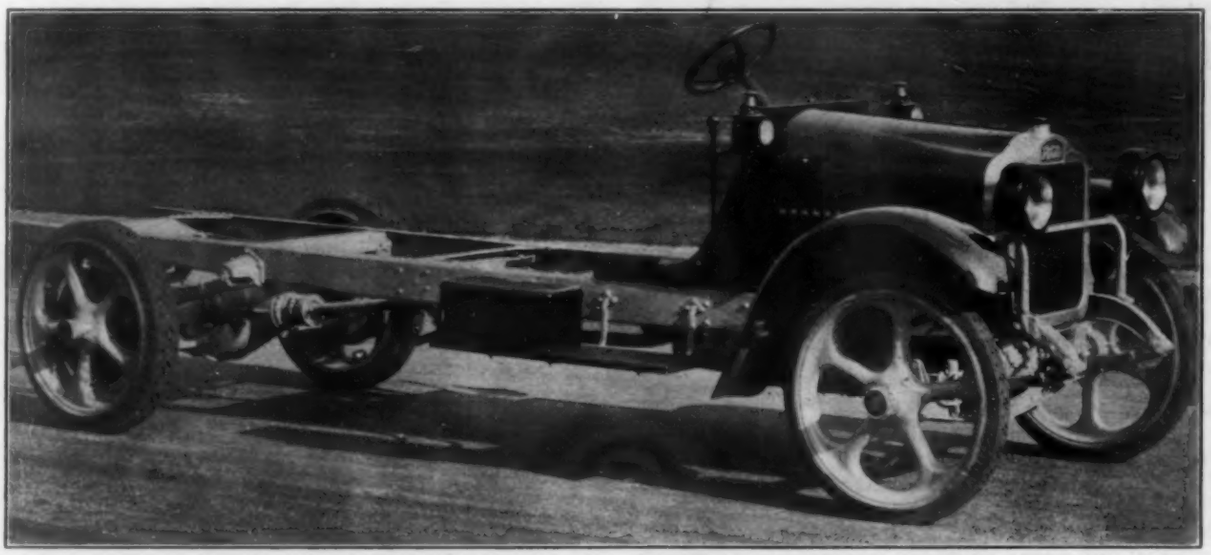
The engine which is combined with the clutch and transmission in a unit power plant assembly is of the "L" head, four-cylinder mono-bloc type with removable cylinder head. The engine has been designed for smooth and efficient operation together with flexibility. The combustion chambers are machined, thereby insuring equal compression pressures in each cylinder. Aluminum alloy pistons of the constant clearance type by their light weight and good heat conducting characteristics insure smooth operation and also assist in keeping the lubricating oil in a clean condition. Connecting rods of I-beam section have direct babbitted bearings and are provided with a drilled hole running lengthwise through rod which enables oil under pressure to be fed to the piston pin bearings. The piston pins float in both the piston and the connecting rod end.

Provision is made for cooling the valve stems and for preserving tight valve seats. Rotating engine parts are dynamically and statically balanced and the weights of the reciprocating assemblies are held within close limits.

The lubrication system provides for a continuous supply of oil under pressure to all crankshaft, camshaft, connecting rod and piston pin bearings. All return oil must pass into a settling chamber before passing through a screen up into the oil reservoir. This separates any sediment that is present and insures that only clean oil is supplied to the pump. A relief valve automatically controls the maximum pressure and is designed to operate irrespective of weather conditions or variations in the viscosity of the oil. The timing and pump driving gears are lubricated through an adjustable orifice set in the main delivery tube which regulates the oil pressure in direct proportion to the engine speed. The piston and cylinder walls are continuously lubricated through metered slots in the connecting rod bearings. Oil control rings are provided to maintain the necessary oil film on the piston skirt. The pistons are designed to prevent the formation of carbon on the underside of the head thereby assisting in keeping the oil in a clean condition. The intake manifold which is fitted with an air cleaner is cast integral with the exhaust manifold and is of the hot-spot type. Three point suspension of the engine is used to relieve the aluminum crankcase of undue strain.

The cooling is provided by positive water circulation effected by a gear driven centrifugal pump. The radiator consists of a heavy cast aluminum casing with removable cellular core and is mounted on spherical seats with a housed form of spring retention. The transmission is of the selective four-speed type with direct drive in fourth. A single plate clutch is used.

The rear axle is of the single reduction type with axle spindles supported at the wheel ends by double bearings of the tapered roller type. The bevel reduction and differential gears are carried on tapered roller bearings. The rear axle reduction can be obtained in two ratios, i. e. 6.33 standard and 5.7 optional. The channel section frame is of heat treated steel with channel section cross members riveted to the frame and heavily gussetted at these points.



Chassis of White Fast Express Model 56 Designed for High-Speed Service

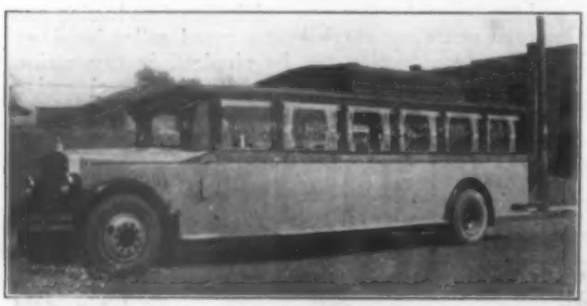
The rear wheel brakes are of the internal expanding two-shoe type operating in large diameter drums. The emergency brake is of the single drum type supported by a self alining ball bearing mounted in the frame cross member. The front axle is of I-beam section and the wheels are supported on the spindles by bearings of the tapered roller type. These bearings are adjustable for wear. The steering gear is of the worm and sector type. Both front and rear springs are semi-eliptic. The wheelbase is 165 in.

THE TAX BILL providing for the payment of a wheel tax by all operators of trucks of more than one-ton capacity amounting to one-fourth cent per ton mile for pneumatic tired vehicles and one-half cent per ton mile for solid tired vehicles has been defeated in both houses of the Iowa State Legislature.

Minnesota Bus Lines in 1926

FIFTEEN intercity bus lines operating in Minnesota carried 4,563,150 passengers in 1926, according to reports made by them to the Minnesota Railroad and Warehouse Commission, summarizing their operations for last year. Of this number, 1,975,024 passengers were carried by the Northland Transportation Company, the bus-operating subsidiary of the Great Northern, which is the largest carrier of passengers upon the highways in Minnesota.

Total revenue collected by the 15 bus lines last year amounted to $3,313,269.49, of which $1,981,628.59 was taken in by the Northland. The Northland operated 133 buses out of a total 282 intercity buses doing business in Minnesota, and the seating capacity of its vehicles, 2,325 passengers, compares with a total seating capacity of all intercity buses in the state of 6,621. Over half the bus line mileage of Minnesota is operated by the Northland, this company having 2,393 miles of



The Northland Is the Largest Bus Operating Company in Minnesota

lines and all bus lines throughout the state 4,659. Well over half the total bus miles operated by bus lines in Minnesota last year were Northland operations. This figure for all intercity bus lines in the state was 12,605,595 bus miles and that of the Northland alone, 7,391,658 bus miles.

Revenues Were Low

Information is not available as to the net incomes earned or the net deficits incurred by the Minnesota bus lines last year, but computations as to revenues per bus mile, figured on the basis of data furnished the Minnesota Railroad and Warehouse Commission, indicate that few were able to pay even operating expenses. It is generally considered that the operating cost of motor buses in Minnesota is approximately 28 cents a mile, including out-of-pocket expenses, depreciation, taxes, license fees and such expenses. If this figure is considered an accurate average, only 4 of the 15 intercity bus lines in Minnesota received revenues last year equalling or exceeding their operating expenses. These were the Twin City & Southern Bus Company with revenues of 59 cents per bus mile; the Jefferson Highway Transportation Company, with revenues of 31 cents per bus mile; the Terminal Motor Bus Company, with revenues of 29 cents per bus mile; and Scott's Bus & Taxi Lines, with revenues of 28 cents per bus mile.

Northland Revenues

Revenues per bus mile of the Northland Transportation Company were a little over 26 cents. The lowest revenues per bus mile were apparently those of the Worthington-Sioux Falls Company, which had revenues per bus mile of a little over 10 cents. The average revenues per bus mile on all the 15 bus lines was only a little more than 23 cents, which would indicate that as a whole the Minnesota bus lines are operating at a loss.

Short Hauls the Rule

A computation of the revenues per passenger carried by the Minnesota bus lines last year indicates that the average length of haul is in the neighborhood of 30 miles. This is based upon the assumption that Minnesota bus lines charge a rate of 3 cents or perhaps a little less per mile.

The revenue per passenger on the Northland was approximately $1, and the average revenue per passenger on all 15 lines was 89 cents.

License Fees and Taxes Heavy

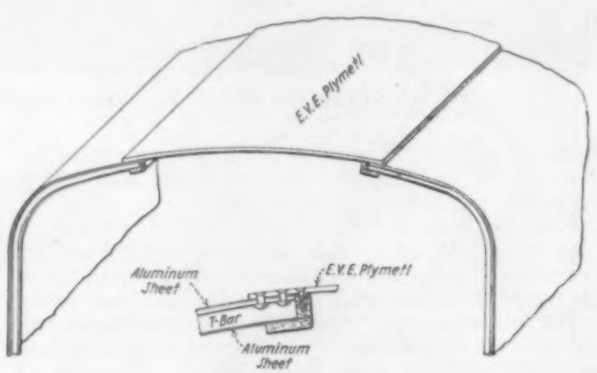
The 15 intercity Minnesota bus lines paid $163,423.51 for licenses last year. On the basis of 12,605,595 bus miles operated, this is equal to 1.3 cents per bus mile. Of this amount the Northland paid $99,170.51. Of its total revenues of $1,981,628.59, therefore, approximately 5 per cent went for licenses.

Gasoline taxes also constituted a fairly heavy item of expense to the Minnesota bus lines. The 15 lines paid $44,769.22 in gasoline taxes last year or approximately three mills per bus mile operated. Over half of this amount was charged to the Northland, which paid $27,288.94 in gasoline taxes.

Plymetl for Bus Roofs

ALTHOUGH Plymetl has been used for side panels in buses, it has only recently been used for bus roof construction. The illustration shows the application of 5/16-in. grade E. V. E. Plymetl to the roofs of the new twin coaches built by Fageol Motors, Oakland, Cal.

The Plymetl was supplied by the Haskelite Manufacturing Corporation, 133 W. Washington street, Chicago, in three pieces, each about 9 ft. long and 42 in. wide and bent to the curvature of the bus roof. These pieces were fastened together end to end to make a one-piece panel 27 in. long and 42-in. wide. The posts of the bus are tee-iron and are bent over at the top



Method of Applying Plymetl to Bus Roofs

to form the roof bows. These roof bows end at the edge of the Plymetl, however, the material itself being stiff enough to carry the roof over the center of the bus roof, thus increasing the head room. The panel was painted inside and out for finish, but no extra covering or lining was necessary.

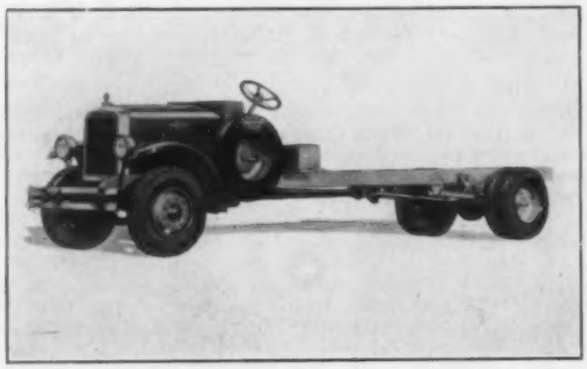
Indiana Six-Cylinder Three-Ton Truck

THE Model 628, three-ton truck manufactured by the Indiana Truck Corporation, Marion, Ind., is provided with a six-cylinder valve in head motor, The six cylinders which have a 4-in. and a 5-in. stroke, give a piston displacement of 377 cu. in.

The transmission is mounted in unit with the motor and is of the selective, sliding gear type. There are four speeds forward and a reverse. The rear axle is of the semi-floating, spiral bevel gear type, carried on double taper roller bearings. The axle shafts are 2 1/16 in. in diameter at the differential and 2¾ in. in diameter at the wheels. The front axle is 3 in. deep, 2⅛ in. wide with a 7/16-in. web. The king pins are 1⅛ in. in diameter.

The double internal expanding brakes on the rear wheels are 2⅛ in. wide and 17 in. in diameter.

The pressed steel channel section frame is 7 in. deep with 3-in. flanges and is made from 5/16-in. material. The length of the frame from the back of the seat



Indiana Model 628 Three-Ton Speed Truck

to the rear end is 180 in. and the width is 33 in. The front springs are 40 in. long with 10 leaves 2½ in. wide. The rear springs are 50 in. long with 15 leaves 3 in. wide. Budd disc steel wheels are used, with the dual type at the rear. These are equipped with 34-in. by 7-in. cord tires.

The truck has a wheel base of 216½ in. and can be turned in a radius of 40 ft. It is fully equipped with the customary accessories.

THE MOTOR BUS FARE between Detroit, Mich., and Chicago has been fixed at $3 following a meeting of the owners of the various lines operating between these cities. The fare was originally $7 but was recently reduced to $5, then to $4 and finally to $2 in a rate-cutting war which lasted for about six weeks.

THREE LARGE INDEPENDENT BUS LINES operating in the west were consolidated on April 1, these including the Yelloway, Inc., the Cornhusker Bus Line and the Interstate Transit Company. All are now being operated as a part of the western division of the Yelloway, Inc., of which R. W. Taggert, Denver, Colo., is president. The Cornhusker and Interstate lines formerly served the territory from McCook, Neb., to Omaha, and from Omaha to Minneapolis. The present mileage of the Yelloway lines is given at approximately 11,200, its lines extending from Cleveland, Ohio; Detroit, Mich.; Chicago, and St. Louis, Mo., to Kansas City, Omaha, Denver, Tulsa, Okla.; Los Angeles, Cal., and San Francisco.

Motor Transport News

Unified Transport Proposed for St. Paul

A plan for unifying motor bus and railway terminals in St. Paul, Minn., by using part of the St. Paul union railway depot as a union bus station, is being sponsored by the mayor of that city and a group of business men. It is proposed that buses use that part of the depot originally designed for a taxicab stand. The plan would permit passengers transferring from buses to trains or from trains to buses to make the change with a minimum of inconvenience. It is also proposed that buses follow one route in making a loop in the downtown district of St. Paul and have specified stopping points for picking up and discharging of passengers.

Missouri Pacific Begins Bus Operation

The Missouri Pacific on April 4 began the operation of a motor bus line between Pueblo, Colo., and Ordway, a distance of 50 miles, due to a demand for additional local passenger service between these points. The service is being operated for the railway by the San Isabel Transportation Company under contract. The transportation company furnishes the equipment and driver, who collects fares at the regular rates for transportation by rail and remits the revenue to the Missouri Pacific.

Under present schedules the one bus regularly in operation leaves Ordway, where it ties up over night, at 10:15 a.m., arriving at Pueblo at 12:40 p.m. Eastbound the bus leaves Pueblo at 2:30 p.m. and arrives at Ordway at 5 p.m., in time to make connection with a through eastbound passenger train. These schedules are operated daily and the equipment used is a 16-passenger White motor bus. The transportation company also has three additional White buses and two seven-passenger touring cars for use in this service in case of emergency.

Jersey Central Gets Authority to Substitute Buses for Trains

The New Jersey Board of Public Utility Commissioners has authorized the Central of New Jersey to discontinue six trains operating between Lakehurst and Barnegat (22 miles) and to substitute therefor bus service between Barnegat and Lakewood (by rail, 30 miles, by highway 25 miles). The main line of the railroad's Southern division touches both Lakewood and Lakehurst so that connections from the Barnegat branch can be made as well at the former point as the latter. Buses in addition to making the three round trips in lieu of train service will make three trips in one direction and two in the other over a part of the route.

Revenues from the eight-passenger trains operated on the Barnegat branch in 1926 were $27,158 and expenses $55,575, leaving a deficit of $28,417. Revenue from the trains to be discontinued was $14,935 and operating cost $36,173. Assuming bus costs, including interest and depreciation, to be $14,085 (30c. a mile), which includes the additional service the buses will give over part of the route. The net estimated saving, therefore, is $15,965. Baggage will be handled by bus or by the remaining train service.

Texas Railroad Commission Favors Bus and Truck Regulation

Regulation of motor buses and trucks operating in Texas was favored by the Railroad Commission of that state in a report to the governor on the Beck bill, providing for such regulation, which was recently passed by the legislature. A voluminous report, giving data from various states was submitted with the statement that "existing law, clearly not contemplating motor transport and not adequate to form the basis of regulation of that form of common carrier service, should be amplified if the commission is to perform satisfactorily its duty with respect to this business."

The commission declared that the "appeal of the motor truck is grounded in solid economic demand justified by experience".

Truck transportation has made the burden on short railway lines, "almost intolerable in some instances, still heavier, and has supplied the most potent argument for the abandonment of some of these short lines." Pointing out that most states now have regulatory laws governing motor transportation, the commission said that the industry itself asked for regulation as protection from irregular operators who function during periods of heavy business and withdraw when business is dull.

"If the business were stabilized, in all probability, actual common carriers would enter the field, to the best interests of the industry and its patrons," the report continued. Legislation similar to the Beck bill would doubtless form a fair basis of regulation, the commission concluded.

B. & M. Plans to Extend Bus Service to Resorts

The Boston & Maine Transportation Company, as part of a plan to increase tourist travel to White mountain resorts, on April 20 filed with the New Hampshire Public Service Commission a request for authority to carry passengers in motor coaches to and from the White mountains and other points within the state. The effect of the petition if granted, it is stated, will be to permit the development of a tourist movement from the Maine and New Hampshire beaches, out of Portsmouth, N. H., to the White mountains, and to develop travel to the mountains also from points like Nashua, Manchester and Concord, in addition to the traffic originating at Boston and other points outside New Hampshire.

The company for two seasons has operated a White mountain motor coach service from Boston through Portsmouth, Dover, Ossipee and Crawford Notch, returning via Franconia Notch and the Daniel Webster highway through Concord, Manchester and Nashua. Under present conditions it cannot accept passengers from beach resorts in and about Portsmouth because of the intra-state travel feature. It is now proposed not only to make it possible to take such passengers to the mountains, but also to operate the line in both directions, running north three or four days a week via the Daniel Webster highway and returning over the Theodore Roosevelt highway route, and during the other days of the week operating the motor coaches out of Boston via the Portsmouth, Ossipee and Crawford Notch route, with a return over the Daniel Webster highway.

Motor Truck Manufacturers Organize at Chicago

The Motor Truck Association of Chicago was organized on March 1, "to promote practical and sane policies governing the sale, service and use of motor trucks in the Chicago territory, to promote and encourage those influences which will protect and assist the business of motor truck transportation, and to discourage practices by manufacturers and distributers and those engaged in motor truck transportation that are in any way injurious."

Some of the matters with which the association will be concerned are closer co-operation between credit and service managers, uniformity in securing information about prospective purchasers of motor trucks, a more conservative basis for the extension of credit, the elimination of abuses in motor truck operation from various causes, and the elimination of a number of practices and demands upon the motor truck industry that are neither economical nor beneficial.

Following are the officers and directors: President, S. M. Williams, manager, Auto Car Sales & Service Company; vice-president, John Nicols, manager, General Motors Truck Company; treasurer, O. E. McCarthy, manager, Pierce-Arrow Truck Company; directors, J. D. Connell, manager, truck department, Reo Motor Car Company; R. M. Cutting, president, Chicago Truck Company; N. N. Griffin, vice-president, International Motor Company; Robert Hendrickson, sales manager, Hendrickson Truck Company; K. B. Harwood, manager, truck department, Dashiell Motor Company; O. E. Pederson, manager, Federal Motor Truck Sales Corporation; H. E. Senour, manager, White Company; and W. F. Whittenberg, manager, Sterling Company.

Orders for Equipment

THE ALTON TRANSPORTATION COMPANY, the bus operating subsidiary of the Chicago & Alton, has ordered two type Z motor buses from the Yellow Truck & Coach Manufacturing Company, Chicago.

THE NEW ENGLAND TRANSPORTATION COMPANY, the bus operating subsidiary of the New York, New Haven & Hartford, has ordered 12 four-cylinder Mack buses from the International Motor Company, New York. These will be fitted with bodies manufactured by the Brown Body Corporation, Cleveland, Ohio. Five of these buses will be operated on old routes and seven on new routes.

Among the Manufacturers

Robert L. Boughton has been appointed assistant to the vice-president of the Export region of the White Company, with headquarters at Cleveland, Ohio.

H. W. Marshall, formerly with the Anderson Company, Gary, Ind., has entered the service of the **American Hammered Piston Ring Company,** Baltimore, Md., in its sales department. Mr. Marshall's territory will include Kansas, Oklahoma, Arkansas and part of Missouri.

A. L. Hayes, district manager of the White Company at Cleveland, Ohio, has been promoted to assistant to the vice-president of the Central region, with the same headquarters. **John Voelker,** sales manager, has been promoted to district manager at Cleveland, succeeding Mr. Hayes. **C. S. Carris, A. F. Ling** and **Richard T. Fullerton** have been appointed branch managers, with headquarters respectively at Columbus, Ohio, Toledo and Erie, Pa.

As a part of the expansion of its branch sales and service organization, the **White Company,** Cleveland, Ohio, has just completed a new building at Milwaukee, Wis., has begun the construction of new buildings at New York and at Los Angeles, Cal., and has prepared plans for the construction of buildings in Syracuse, N. Y., Providence, R. I., and Hartford, Conn. The building at Milwaukee has dimensions of 180 ft. by 140 ft. That to be constructed at New York, which will cost $250,000, will be two stories in height and will have dimensions of 200 ft. by 150 ft. The Los Angeles branch building will cost $500,000, will be one story in height and will have dimensions of 330 ft. by 202 ft.

Blake C. Hooper has been appointed manager of railroad sales of the **Baker-Raulang Company,** Cleveland, O., manufacturers of Baker electric tractors, trucks and cranes and Raulang bus and automobile bodies. Mr. Hooper has been connected with the Baker organization for several years as secretary-treasurer of the Minnesota Supply Company, St. Paul, Minn., which is the Baker representative in that territory. Mr. Hooper is a graduate mechanical engineer, having attended Armour Scientific Academy and Armour Institute of Technology. Upon leaving college he entered the service of the Chicago, Rock Island & Pacific which company he left in 1908 to take a position in the drafting department of the Railway Materials Company, Chicago. He was assistant superintendent of the Toledo, O., plant until June, 1909, returning to the general offices at Chicago as mechanical engineer and later as plant superintendent. In 1912, Mr. Hooper resigned to enter the railway supply field, and has been engaged in selling technical products to railroads since that date, with the exception of the period of the war, during which he served in the army as a captain.

B. C. Hooper